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STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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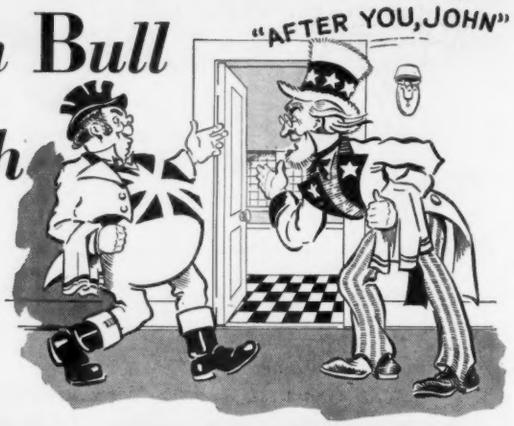
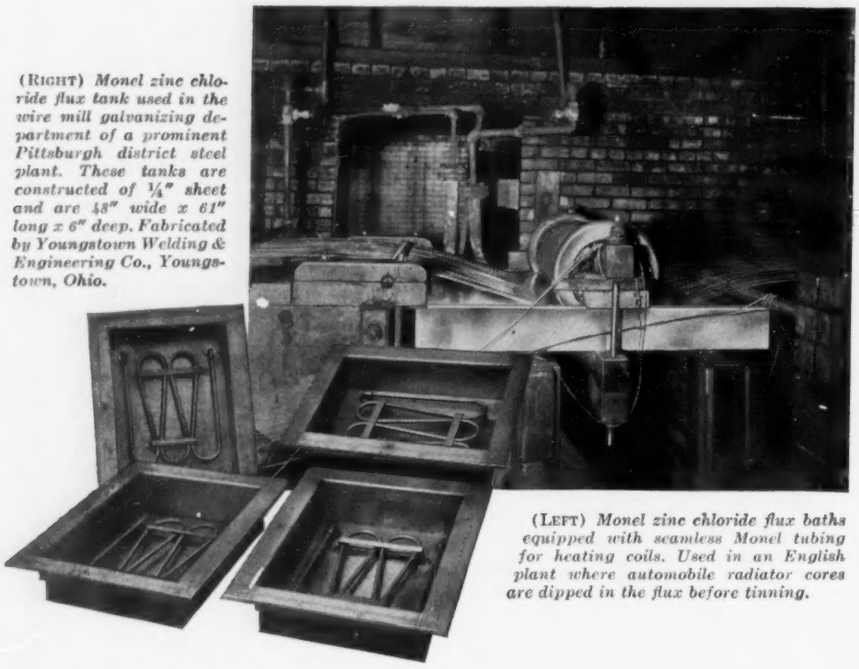
Uncle Sam and John Bull ...both use the Same Bath



Each finds that Monel is the ideal material for holding zinc chloride flux



(RIGHT) *Monel zinc chloride flux tank used in the wire mill galvanizing department of a prominent Pittsburgh district steel plant. These tanks are constructed of ¼" sheet and are 48" wide x 61" long x 6" deep. Fabricated by Youngstown Welding & Engineering Co., Youngstown, Ohio.*

(LEFT) *Monel zinc chloride flux baths equipped with seamless Monel tubing for heating coils. Used in an English plant where automobile radiator cores are dipped in the flux before tinning.*

Visit a certain automobile plant in England and you'll see zinc chloride baths in which radiator cores are dipped prior to tinning.

In Pittsburgh you'll find one of the steel mills passing wire to be galvanized through the same sort of bath...zinc chloride flux.

In both plants, the zinc chloride flux is held in Monel. England's experience illustrates why: After the first tanks installed in the English automobile plant had been in continuous service for 45 months, the user stated:

"Apart from some discoloration, the baths have not suffered in any way, and are as good as when we purchased them."

Incidentally, in both of these plants Monel pickling equipment used in corrosive acid solutions has given many years of service.

For light-weight pickling equipment good for years of service use Monel. For assistance in selecting suitable designs call on INCO engineers. Write for "Equipment Designs for the Pickle House" and "A Good Start to a Better Finish."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York, N. Y.

News Flashes

Fused Salt Bath Heated with Nickel Electrodes

Nickel Electrodes are giving satisfactory service in a heat treating furnace that used an electrically heated bath of fused salt. The electrode passes down through the cover and dips into a pot of fused salt containing barium, potassium and sodium chlorides, but no sulfur. They withstand 500 hours actual exposure at 1200 to 1300 deg. F.

New Armor Plate for Police Cars

A recent development in the war against crime is an armor plate for police cars. Made of nickel-chromium steel by the Jessop Steel Co., Washington, Pa., it can be formed, punched, drilled or otherwise fabricated.

Properties of Cast Monel Compared with Rolled Steel

	Cast Monel Fed. Spec. QQC-551	*Rolled Steel* ASTM A-7-36
Minimum tensile strength lb./sq. in.	65,000	60,000
Minimum yield point lb./sq. in.	32,500	33,000
Minimum elongation % in 2 in.	25	22

Nickel Iron Marine Cylinder

A high pressure marine cylinder weighing six tons was cast recently by the Houston Foundry and Machine Company, Houston, Texas. Overall height was 7½ feet and width 8 feet. Cylinder bore was 25 inches. Made of alloy iron containing upwards of 1 per cent nickel, it showed a tensile strength of 40,000 psi.

Measures 9,600,000 Gallons of Water in Year

A water meter with Monel working parts was recently tested in Flint, Michigan, under severe conditions. Within the year 9,600,000 gallons of water had passed through the meter and the Monel parts revealed no corrosion or wear.

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

INCO MONEL **MONEL**

As the Editor Views the News

■ WHEN the head of an important manufacturing company is elected governor of a state hitherto noted for its left-wing leanings, it is news. Julius P. Heil, president and treasurer, Heil Co., Milwaukee, last week (p. 24) was elected governor of Wisconsin by a majority of landslide proportions. In general, election results over the country as a whole (p. 23) were interpreted by business men as a stinging rebuke to those responsible for governmental hostility toward business, and as presaging more favorable treatment of business by the next congress. Stimulated confidence was reflected by a sharp upturn in values on the stock exchange. It remains to be seen whether New Dealers will heed the mandate of voters or whether friction will hold back needed action.

• • •

Business news becomes more cheering. Production of steel (p. 27) rose 4 points to 61½ per cent of ingot capacity last week, and the steel industry now definitely is on the profit side of the "break-even" point. Orders have been pouring into automobile plants (p. 38) in numbers exceeding expectations, and the industry is confident 1939 will be a better automobile year than 1938. Versatility of the English language, incidentally, is well attested by some of the current automobile advertising. STEEL'S index of industrial activity (p. 41) now stands at 93.4 per cent, a new high for the year, and there is no sign of faltering. Government spending is mounting rapidly (p. 34) and will not reach its peak until next spring. Vessels under construction (p. 29) number 129.

Now on the Profit Side

• • •

In case the public contract board's recommendation that minimum wages in the steel industry should be 62½ cents an hour in the North and 45 cents in the South is adopted, fewer than 15,000 laborers in the industry would have their pay increased (p 28) by 2 to 10 cents an hour . . .Exports of iron and steel products in the past ten years aggregated 14,853,867 gross tons (p. 26), compared with nearly twice as much tonnage during the preceding ten years; there also has been considerable alteration in the character of the demand from abroad . . . There are various approaches to the problem of reducing manufacturing costs (p. 25) and one steel executive regards the foreman as the vital factor in such a program. One company pays a bonus on savings effected.

Few Workers Affected

• • •

About $1,350,000 worth of parts are in process at all times in the various departments of a food machinery manufacturing plant. To check the movement of these parts (p. 44) 20,000 cards detailing 160,000 time studies constitute the heart of an elaborate control system. Approximately 20,000 different tools and jigs are required. . . . Modern trends in electric circuits in the steel industry are revealed (p. 46) by the system at the new 98-inch strip mill in Cleveland. . . . A newly designed railroad passenger car (p. 48) embodies new features that assist in reducing weight and bring increased riding comfort at high speeds. Of welded construction, it weighs 1125 pounds per passenger. . . . A new furnace stress-relieves vessels that (p. 67) are longer than itself.

Many Tools And Jigs

• • •

Unveiling of a large new autobody hardware and fittings plant (p. 57) reveals a highly developed mechanized handling system designed to prevent layoffs of operators in the event of equipment failures anywhere along the line. . . . New straightline units (p. 73) increase galvanizing speeds by 10 to 15 per cent on light gages and 50 to 100 per cent on extremely heavy gages and produce coatings with thinner alloy layers. . . . Now in sight, according to a well-known research worker, is the generation of electric power direct from combustion of fuel without intermediate conversion (p. 53) to mechanical power. . . . Silver can be made untarnishable but the process (p. 67) is not yet commercial. . . . One company uses a selective conveyor (p. 64) to sort scrap.

New Plant Dedicated

E. L. Shaner

All Structural Parts of This Equipment Are Made *Lighter, Yet Stronger with Inland Hi-Steel*

You make a daily saving in the operating cost of this equipment because it is about 25% lighter than if built with equal strength of ordinary steel. Being lighter, it saves power, handles more pay load in each operation and handles much more quickly and conveniently. Inland Hi-Steel has about twice the yield strength of ordinary steel. Our choice of Inland Hi-Steel has been guided by extensive research into its special advantages for your purposes.

Extra Corrosion Resistance—Longer Service

Inland Hi-Steel is more resistant to atmospheric corrosion than even copper-bearing steel. Therefore it gives added life when exposed to moisture and weather; and your equipment retains higher re-sale value. Inland Hi-Steel also has fabrication advantages which enable us to give you a better built, welded unit at a remarkably low price.

THE JOHN DOE EQUIPMENT COMPANY

Inland Hi-Steel is economical to fabricate. No special equipment is required. It cuts and punches without burr, requires no special heat-treatment and welds readily by all welding methods in use. Write for detailed bulletin. — Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.

New customers will be attracted to purchase your product when you build it lighter yet stronger with Inland Hi-Steel . . .

INLAND HI-STEEL

Washington Views Next Step as Revision of Radical Legislation

WASHINGTON

■ SUFFICIENT time has elapsed since last Tuesday's election for Washington to view the new political picture dispassionately.

Here it is considered the election gave the national administration a new mandate—to veer from the left toward a middle of the road course.

Left-wing losses—greater than even the most optimistic conservatives had expected—constituted the New Deal's first great nation-wide rebuke.

Business and industry received the results with enthusiasm. Security markets rose immediately and sharply. Before the week was out business had quickened its pace. Sentiment improved. There was no mistaking the implications of all this, and the effect it may have in the coming session of congress.

A yellow light—if not red—for the ultra-liberals, the conservative gains were hailed as a positive green light for business and industry.

These gains generally were interpreted as meaning the President and his inner circle would not be able to push through any more radical legislation.

Nowhere, however, were the results interpreted as a sign of reversal to the social and economic order of the Coolidge and Hoover days, or that the stated reform objectives of the administration were to be generally abandoned.

How Will New Deal React?

Question of the week was how the President and New Dealers would react to their setback. Three possibilities suggest themselves:

1—They may accept the new mandate, pursue a more moderate course, propose no more radical legislation, and adopt a persuasive and conciliatory attitude toward congress, and toward business and industry.

2—They may ignore the obvious, and continue on the path marked during the past six years.

3—They may become retaliative, even more aggressive, and attempt a stronger leftist program.

Considered most important, however, is the election's effect on congress. Collapse of the President's inter-party purge at the primaries was confirmed by the November losses of his party as a whole.

Coalition Probable

Net result is a congress that will include 81 more Republicans and a large number of Democrats to whom it has been demonstrated that opposition to administration proposals is not political suicide. A coalition of Republicans and conservative Democrats of sufficient strength to defeat any radical measure is probable.

Republicans will hold 170 seats in the house, out of a total membership of 435. Thus a coalition of 48 anti-New Deal Democrats with the Republican membership would give such forces a majority.

On some issues in the past—and before the purge failed—more than 48 Democrats have deserted the administration.

In the senate the Republicans will hold 23 seats and a coalition would require 26 Democratic votes to be effective.

While it remains to be seen whether a coalition will be formed to stalemate the New Dealers on all reform measures, it is considered certain that it will prevent more reckless experiment.

Political observers last week predicted efforts to revise some of the measures which have been thorns in the side of business and

Watchmaker Works in Steel Plant

■ **Not far from his bench, huge rolling mills turn out tons of pipe every minute, yet he follows his craft, learned while making and repairing fine watches. The watchmaker is employed in Jones & Laughlin Steel Corp.'s tube mills, Pittsburgh, to check and repair precision gages, used for examining pipe threads, which have as delicate mechanisms as those in expensive watches**

industry. First among these, they say, will be the national labor relations act. If the conservative element succeeds in this, further attacks, on down the line, can be expected.

Left-wing organized labor as represented by the CIO was dealt as stinging a rebuke as were the New Dealers. In Michigan, where it was practically the only issue, CIO's gubernatorial candidate, incumbent Frank Murphy, was defeated by the Republican candidate who promised violence and seizure of plants would no longer be tolerated (see page 38).

In Ohio, a CIO-endorsed candidate for governor was defeated. Labor unions also were issues in Minnesota, Wisconsin and other states where the conservatives made definite inroads.

There is nothing sectional or local about the conservative and Republican gains. They stretch from New England to the West coast, in both industrial and agricultural areas in 24 states—unquestionably representing a national trend.

Greatest significance of the election was not statistical. Rather it lies in the restoration of balance. Deciding votes were those of the average tax payer—the middle class. The results definitely re-established this class holds the balance of power.

Steel Equipment Manufacturer To Give Wisconsin Business Government

MILWAUKEE

■ IN THE ELECTION of Julius P. Heil, Milwaukee manufacturer, as governor of Wisconsin, advocates of good government last week claimed an outstanding victory. In a Republican landslide he polled nearly 522,000 votes against 339,000 for Gov. Philip F. LaFollette.

Mr. Heil is president and treasurer of the Heil Co., manufacturers of steel motor truck bodies, tanks, oil burners, furnaces, water supply systems. Born in Germany, he came to the United States as a small boy with his parents, who lived on a farm in Waukesha county, Wisconsin. He went to school until he was 12, then went to work as an apprentice drill press machinist in Milwaukee.

At the age of 24 he established the Heil Rail Joint Welding Co., which pioneered processes for welding rail joints for electric street car lines. He was a protege of Herman Falk, president, Falk Co., Milwaukee, and Gen. Otto H. Falk, chairman of the board, Allis-Chalmers Mfg. Co., for whom he worked at the Falk Co. in his early years. He is now 63.

The Heil Co. was organized in 1909 to manufacture welded steel tanks, motor truck dump bodies, hydraulic hoists. In recent years it has branched out in numerous specialties requiring large tonnages of steel plates and sheets, as well as iron and steel castings.

Mr. Heil's proudest boast is his long record as an employer. He claims never to have had a labor dispute and always to have operated in harmony with his employes, now numbering nearly 1000. His shops now are organized and affiliated with the Iron, Steel and Tin Workers' union.

His political philosophy is that of bringing business experience into state government, preventing "progressive" idealists from surrounding business, commerce and industry with crushing rules and laws.

In a campaign speech he said: "You are about to engage a managing director for the biggest business in Wisconsin—the state itself. I am an applicant for that job."

Julius P. Heil

Starting from scratch, he is today rated as worth more than a million dollars, though he refers to his worth as being almost entirely in "brick, mortar, stone, machinery, and above all, men." During his campaign he said he would gladly turn back the governor's salary of $5000 annually as a small start at economy in government.

"I have been trying to do something for others all my life," he declared. "Now, when I am at my best in experience and mental faculties, with prejudices gone or fading, convinced that selfishness is our greatest trouble in government, I have ambition to be of service to the people of my state."

"We've got to cut out selfishness and give our neighbors a break. We've got to get governmental religion, and when we are ready fairly to give and take, watch our problems fade and our troubles disappear."

Sponsors Sports

He is an ardent sportsman; was a bicycle racer in the 90's. He sponsors bowling teams, which have won the world's women's championship, the world's match game championship for men, and the 1936 bowling championship in the Olympic games. He has a large interest in Uncle Walt, a famous trotting horse. Many famous baseball players are "graduates" of Heil sponsored teams.

He once was elected treasurer of the Republican state central committee, but immediately resigned when he failed to obtain satisfactory pledges of co-operation from the others. His name was first mentioned for the governorship in 1932 when the "regular" Republicans looked for some one able to defeat "brash young Phil," then still a Republican, for nomination. However, Walter J. Kohler, head of the large Kohler manufacturing enterprises at Kohler, in Sheboygan county, was selected instead.

Mr. Heil in 1933-34 served as chairman of the NRA compliance board in Milwaukee, which eliminated him as a candidate for governor at the time.

He is an active fraternalist. He was potentate of Tripoli temple, Mystic Shrine in 1917. He is now chairman of the board of trustees of the temple. He also is chairman of the board, Elks, Milwaukee lodge No. 46.

Mr. Heil lives in a beautiful estate on Lake Michigan, in the village of Whitefish Bay, Milwaukee residential suburb. His only son, Joseph F. Heil, is vice president of the Heil Co.

Offers Course Leading to Degree in Welding Work

■ Due to demand for men specifically trained in all phases of welding engineering, Ohio State university's college of engineering, Columbus, O., is offering a new curriculum leading to a degree in welding engineering. This is result of increased recognition that welding engineers need a specialized training to enable them to have the proper background for this work. Up to this time, welding progress has been almost always dependent upon the co-operation of several kinds of engineers, it was pointed out by Dean C. E. MacQuigg of the university.

Production Executives Seek Means For Obtaining Lower Unit Costs

■ UNIT costs, quality control and inventory manipulation were among principal topics discussed at the production division conference, American Management association, at Hotel Pennsylvania, New York, Nov. 9-10. Other important questions included personnel development, job evaluation and wage classification.

A feature was a symposium on unit costs in which 12 executives representing as many industries held an open discussion of cost problems. Earle M. Richards, assistant to vice president in charge of operations, Republic Steel Corp., Cleveland, represented the steel industry.

This speaker suggested four fundamentals in lowering unit costs: (1) Installing improved equipment; (2) improving layout of existing equipment—or a combination of this method with the foregoing; (3) operating some plants at a constant predetermined rate regardless of orders; and (4) renewed efforts on existing control and incentive systems.

Alvin E. Dodd, president of the association, pointed out that control of cost units has been made more difficult by rising taxes, increased costs of many types of materials and by wage and hour legislation and similar measures.

Commenting on installation of improved equipment, Mr. Richards said that in the experience of his company this did not put men out of work. Every technological improvement, he added, is the result of, or follows, the greatly increased demand for a given commodity. Because of this increased demand, there is an inevitable increase in employment in industry as a whole.

Foremen Exert Influence

Mr. Richards declared the foreman to be a vital factor in a cost reduction campaign. "It is the foremen," he said, "who actually spent most of the money of the corporation because they play a large part in determining the crews, in seeing that they operate efficiently, in originating requests for material, in controlling use of water and power, in supervising and controlling the amount of scrap or defective material produced and in supervising, in general, manufacture of the product."

He said his company in attempting to gain the foremen's co-operation had put standards on every item under the foreman's control—labor, materials, repairs, power, etc.

The company also tries to make foremen think constructively by charting their performance, by holding periodic meetings to discuss ways and means of improving their work and by insisting upon suggestions from each of them, and by compensating them for improvements.

Stanley Powell, superintendent, Seybold division, Harris-Seybold-Potter Co., Dayton, O., machinery, described a condition late in 1936 when his company was faced with the problem of getting production speeded up to meet rapidly expanding orders, and outlined an analysis of shop problems which subsequently developed. "It was evident," he said, "we had to do two things—(1) develop ways and means to get immediate results and (2) formulate a long range program on the basis of permanent organization. With this in mind we decided to analyze the shop problems."

Human Element Important

His company classified the problems as: (1) Variety and types of machinery manufactured; (2) quantities of machines in a lot; (3) high number of one and two piece jobs due to special machines and service requirements; (4) spoiled work; and (5) proper and adequate inspection of finished work.

Others were: (6) maintaining scheduled shipping dates; (7) inventory control; (8) cost of supplies; (9) effective co-operation and efficient co-ordination between departments; (10) time involved in turnover of products; (11) re-operation costs; (12) lack of skilled operators; (13) how to train men quickly; (14) train the foremen as instructors; and (15) developing the proper esprit de corps of the supervisory force.

"It will be observed from the foregoing," Mr. Powell said, "that the problems can be classified under three headings—(1) problems which involve only the human element; (2) problems which deal with methods and material; and (3) problems which are a combination of 1 and 2."

With labor a major item in production cost, Earl Bement, Murray Corp. of America, Detroit, said it is important that management leave no stone unturned in obtaining co-operation of employes in development of work simplification programs, and added that when the management is making changes the workers should be duly advised before changes are made.

W. C. Zinck, assistant general manager, North & Judd Mfg. Co., New Britain, Conn., hardware, outlined what his company is doing in stimulating interest of employes in cost reduction. He stated that all employes from foremen down are given bonuses of 50 per cent of the first year's savings from any suggestion submitted for cutting costs through increased productivity or other measures.

One method used for controlling costs, he said, is the setting up of a weekly budget for each department which is a fixed percentage of incoming orders for each department's products. A set of index cards is also used, covering every set of tools with hourly reports as to production of the machines. This, he asserted, provides a basis for tracing causes of idle machinery time.

Raymond S. Perry, vice president, Ingersoll Milling Machine Co., Rockville, Ill.—machine tools, also participated in the symposium.

Speaking on quality control, R. W. Simon metallurgist, Carnegie-Illinois Steel Corp., Pittsburgh, outlined the means for control not only through inspection and tests, but, what he believed to be even more important, through a manufacturing program planned and executed on the basis of a complete understanding of all the requirements essential to the consumer.

The steel industry concerns itself with the manufacture of two general types of products. The first, he said, involves such items as rails, tubes and structural shapes, which are ultimately used in the form shipped. The second includes such products as bars, sheets and tin plate which usually are fabricated into many items before ultimate use. The speaker dealt with the latter group since methods of control set up for these products include consideration of various fabricating procedures as well as production processes in the steel plant.

Must Satisfy Customer

Mr. Simon emphasized importance of building up proper producer-consumer relationships. His company, he said, has a group of technical contact representatives trained specifically along lines of certain commodity classifications. They endeavor to see that the specifications meet requirements of the consumer. They develop the ultimate purpose, type of processing equipment, methods of handling and treatment, surface or physical requirements, tolerance limitations and other factors essential to successful steel performance, he said.

It is equally desirable, he pointed out, that contact men maintain close personal relationship with the mills where the steel is made. This en-

(*Please turn to Page* 102)

Important Shifts in Consuming Countries

	—1928-1932— Tons	Ratio per cent	—1933-1937— Tons	Ratio per cent	—10-Year Total— Tons	Ratio per cent
Canada	8,310,513	43.1	1,293,334	18.0	4,603,847	31.0
Japan	656,263	8.6	1,143,585	15.9	1,799,848	12.1
Mexico	307,611	4.0	396,076	5.5	703,687	4.7
Philippine Islands	354,332	4.6	349,149	8.4	703,471	4.7
United Kingdom	199,233	2.6	414,514	5.8	613,747	4.1
Brazil	226,314	3.0	367,976	5.1	594,290	4.0
China	222,005	2.9	294,526	4.1	516,531	3.5
Argentina	308,698	4.0	203,342	2.8	512,040	3.4
Cuba	201,242	2.6	202,066	2.8	403,308	2.7
Venezuela	204,849	2.7	175,906	2.4	380,755	2.6
Chile	243,113	3.2	128,617	1.8	371,730	2.5
Colombia	152,814	2.0	183,524	2.5	336,338	2.3
Soviet Union	38,632	0.6	210,951	2.9	249,583	1.7
Netherland Indies	155,950	2.1	80,207	1.1	236,157	1.6
Panama	83,053	1.1	88,356	1.2	171,409	1.2
Peru	96,316	1.3	74,749	1.0	171,065	1.2
Union of South Africa	57,446	0.8	106,290	1.5	163,736	1.1
Sweden	13,629	0.2	147,964	2.1	161,593	1.1
Kwantung	32,300	0.4	127,062	1.7	159,362	1.1
British India	85,074	1.1	57,055	0.8	142,129	0.9
Netherland West Indies	63,305	0.8	55,027	0.8	118,332	0.8
Australia	54,705	0.7	58,654	0.8	113,359	0.8
Uruguay	49,919	0.7	62,325	0.9	112,244	0.8
Mozanbique	12,941	0.2	88,222	1.2	101,163	0.6
TOTAL	7,130,257	93.3	6,309,477	87.5	13,439,734	90.5
ALL EXPORTS	7,651,219	100.0	7,202,648	100.0	14,853,867	100.0

Iron, Steel Export Figures Reflect Great Changes in World Trade

■ CONSIDERABLE shifting of markets and a notable change in character took place in the export trade of the United States in iron and steel products, scrap excluded, during the 10-year period ended Dec.31, according to a survey by Benjamin W. Ashmead of the commerce department's metals and minerals division.

Exclusive of scrap, shipments during 1928-1937 amounted to 14,853,867 gross tons, in comparison with 27,874,631 tons in the preceding ten years and 28,219,609 tons in 1908-1917.

Shifting trends of export trade during the 10-year period are shown in the accompanying comparative table, which contrasts shipments of outstanding products in the two 5-year periods, so as to show the change in ratios of individual items.

With the changing character of trade, numerous shifts have occurred in markets. For example, Canadian purchases during 1933-37 recorded a decline of about 50 per cent from its 1928-32 total. In the later period, steady progress was made in its own iron and steel industry, which is supplying an increasingly greater part of its consumption requirements. Then, too, Canada has a small but growing export trade.

The 24 markets listed accounted for 90.5 percent of all shipments during the 1928-37 period, when our iron and steel exports reached every world market with the sole exception of Greenland and, in volume ranged from 8 tons each to Madagascar and Gibralter to 4,603,847 tons to Canada.

In the 10-year period, 1928-1937, North and Central America and the West Indies took 42.7 per cent; the Far East 26.9 per cent; South America 17 per cent; Europe 11.1 per cent, and Africa 2.3 per cent.

One example of change in character of iron and steel export trade is offered by two semifinished products, pig iron and steel ingots. In the 1928-32 period the combined export total of these items was 253,163 tons, 3.3 per cent of the aggregate 7,651,942-ton trade. However, in 1933-37 the combined figure was 1,221,354 tons, 17 per cent of the 7,202,648 tons shipped in these years.

Export trade in pig iron and steel ingots alone in 1937 totaled 1,121,158 tons, only about 100,000 tons lower than the entire iron and steel trade of 1936. On the other hand, the 1929 total for these two items was only 89,000 tons.

Why 1937 Was Record Year

It is clearly demonstrated, therefore, that in times of unnaturally high iron and steel consumption Europe and Japan, not having adequate supplies of iron ore and also lacking sufficient blast furnace and steel furnace capacity must look to the United States to fill in where domestic supply leaves off.

Further, at such times minor consuming and nonproducing countries must also look to the United States to fill their requirements when local consumption causes Europe to curtail exports.

Both situations obtained in 1937 and resulted in the tremendous expansion in shipments of pig iron and steel ingots. A favorable factor in our exports of these products was ability of American shippers to make prompt delivery, which in 1937 helped our trade in these materials to attain record levels.

How Exports Have Altered in Character

	—1928-1932— Tons	Ratio per cent	—1933-1937— Tons	Ratio per cent	—10-Year Total— Tons	Ratio per cent
Tin plate	848,627	11.1	1,002,104	13.9	1,850,731	12.4
Black steel sheets	620,825	8.1	654,929	9.1	1,275,754	8.6
*Plate	529,607	6.9	610,731	8.5	1,140,338	7.7
Plain shapes	735,321	10.5	281,407	3.9	1,016,728	6.8
Pig iron	153,753	2.0	798,705	11.1	952,458	6.4
*Steel bars	522,247	6.8	337,589	4.7	859,836	5.8
Galvanized sheets	475,304	6.2	341,295	4.7	816,599	5.5
Skelp	464,574	6.1	291,862	4.1	756,436	5.1
Heavy rails	396,256	5.2	354,673	4.9	750,929	5.0
Casing and oil-line pipe	334,514	4.4	230,664	3.2	565,178	3.8
Steel ingots, etc.	99,410	1.3	422,649	5.7	522,059	3.5
Barbed wire	201,500	2.6	164,904	2.4	366,404	2.5
Welded black steel pipe	266,156	3.5	83,377	1.2	349,533	2.4
Wire rods	167,575	2.2	161,579	2.2	329,154	2.2
Strip steel, hot-rolled	152,108	2.0	166,028	2.3	318,136	2.1
Fabricated shapes	107,590	1.5	202,836	2.8	310,426	2.1
Welded galvanized steel pipe	150,824	1.9	88,903	1.3	239,727	1.6
Galvanized wire	79,641	1.0	99,498	1.5	179,139	1.4
Strip steel, cold-rolled	62,159	0.8	101,337	1.4	163,496	1.1
Plain wire	61,036	0.8	101,455	1.4	162,491	1.1
'Other' shapes	136,297	1.8	23,644	0.3	159,941	1.0
Car wheels & axles	62,639	0.8	65,666	0.9	128,305	0.9
Unlined tanks	35,804	0.5	85,721	1.2	121,525	0.8
Rail joints, etc.	66,865	0.9	48,148	0.7	115,013	0.8
Wire nails	55,254	0.7	59,726	0.8	114,980	0.8
Cast-iron pressure pipe & fittings	53,853	0.7	60,580	0.8	114,433	0.8
Light rails	80,388	1.1	29,276	0.4	109,664	0.7
Boiler tubes	63,686	0.8	45,639	0.6	109,325	0.7
TOTALS	6,983,813	91.2	6,914,925	96.0	13,898,738	93.6
ALL EXPORTS	7,651,219	100.0	7,202,648	100.0	14,853,867	100.0

*All classes.

■ A sheet and tin plate mill is being built near Athens, Greece, according to the American commercial attache at Athens. All the shareholders in the company, known as National Steel Industry, were formerly connected with the steel sheet industry in the United States.

October Ingots Gain 17 Per Cent

■ STEEL ingot production in October amounted to 3,117,934 gross tons, 17.3 per cent more than 2,657,748 tons in September, the American Iron and Steel institute reports. This was the first month that output exceeded 3,000,000 tons since October, 1937 with 3,392,924 tons.

October's weekly average was 703,823 tons, compared with 620,969 tons in September and 765,897 tons in October last year. The ten months' total this year was 21,123,872 tons, 53.9 per cent less than 45,875,521 tons in the same period of 1937.

Operations averaged 52.45 per cent of capacity in October, the first time above 50 per cent this year. This compares with 46.28 per cent in September and 58.31 per cent in October, 1937.

STEEL CORP. SHIPMENTS BEST IN TWELVE MONTHS

Shipments of finished steel by the United States Steel Corp. in October totaled 663,287 tons, 85,621 tons or 14.8 per cent more than 577,666 tons in September. This is the largest since last October, with 792,310 tons.

District Steel Rates

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Nov. 12	Change	Same week 1937	Same week 1936
Pittsburgh	48	+ 3	32	68
Chicago	58	+ 1.5	35	76
Eastern Pa.	35	None	38	47.5
Youngstown	66	+ 3	43	70
Wheeling	64	+ 5	54	92
Cleveland	77	None	35	80.5
Buffalo	49	— 2	32.5	84
Birmingham	68	None	54	74
New England	72	+ 1	30	73
Cincinnati	75	None	15	96
St. Louis	51.5	+ 6	33.3	68
Detroit	82	None	82	100
Average	61.5	+ 4	39	74

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1938	1937	1936	1935
Jan.	518,322	1,149,918	721,414	534,055
Feb.	474,723	1,133,724	676,315	583,137
Mar.	572,199	1,414,399	783,552	668,056
April	501,972	1,343,644	979,907	591,728
May	465,081	1,304,039	984,097	598,915
June	478,057	1,268,550	886,065	578,108
July	441,570	1,186,752	950,851	547,794
Aug.	558,634	1,107,858	923,703	624,497
Sept.	577,666	1,047,962	961,803	614,933
Oct.	663,287	792,310	1,007,417	686,741
10 mo.	5,251,511	11,749,156	8,875,124	6,027,964
Nov.	.....	587,241	882,643	681,830
Dec.	.....	489,070	1,067,365	661,515
Y'rly adj.	....	†77,113	†40,859	†23,750
Total	.....	12,748,354	10,784,273	7,347,549

†Deduction.

Steel Ingot Statistics

Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 98.29 per cent in 1936

1938	—Open Hearth— Gross tons	Per cent of capacity	—Bessemer— Gross tons	Per cent of capacity	— Total — Gross tons	Per cent of capacity	Weekly production, all companies, gross tons	Number of weeks in month
Jan.	1,632,773	30.25	99,991	18.27	1,732,764	29.15	391,143	4.43
Feb.	1,578,233	32.38	125,493	25.40	1,703,726	31.74	425,931	4.00
March	1,854,669	34.36	157,737	28.83	2,012,406	33.85	454,268	4.43
April	1,793,522	34.31	131,644	24.84	1,925,166	33.44	448,757	4.29
May	1,676,215	31.06	130,590	23.87	1,806,805	30.39	407,857	4.43
June	1,519,589	29.07	118,688	22.40	1,638,277	28.46	381,883	4.29
July	1,854,076	34.43	127,982	23.44	1,982,058	33.42	448,429	4.42
Aug.	2,350,199	43.54	196,789	35.97	2,546,988	42.85	574.941	4.43
Sept.	2,449,861	46.98	207,887	39.32	2,657,748	46.28	620,969	4.28
Oct.	2,894,726	53.63	223,208	40.79	3,117,934	52.45	703,823	4.43
10 mos.	19,603,863	.....	1,520,009	.....	21,123,872	.....	486,388	43.43
1937								
Jan.	4,426,227	84.07	292,209	54.38	4,718,436	81.32	1,065,110	4.43
Feb.	4,083,070	85.89	331,629	68.34	4,414,699	84.27	1,103,675	4.00
March	4,814,926	91.45	403,400	75.07	5,218,326	89.94	1,177,952	4.43
April	4,682,084	91.83	388,783	74.71	5,070,867	90.25	1,182,020	4.29
May	4,769,238	90.59	382,671	71.21	5,151,909	88.79	1,162,959	4.43
June	3,900,108	76.50	284,615	54.69	4,184,723	74.48	975,460	4.29
July	4,220,848	80.10	335,456	62.56	4,556,304	78.48	1,030,838	4.42
Aug.	4,504,567	85.29	373,259	69.46	4,877,826	83.83	1,101,089	4.43
Sept.	4,021,035	78.80	268,472	51.71	4,289,507	76.30	1,002,221	4.28
Oct.	3,204,209	60.67	188,715	35.12	3,392,924	58.31	765,897	4.43
10 mos.	42,626,312	.....	3,249,209	.....	45,875,521	.....	1,056,309	43.43
Nov.	2,040,480	39.90	113,885	21.88	2,154,365	38.23	502,183	4.29
Dec.	1,386,188	26.31	86,833	16.19	1,473,021	25.37	333,263	4.42
Total	46,052,980	74.20	3,449,927	54.54	49,502,907	72.38	949,423	52.14

Percentages of capacity operated for 1938 are calculated on weekly capacities of 1,218,342 gross tons of open-hearth ingots and 123,514 gross tons of bessemer ingots, total 1,341,856 gross tons; based on annual capacities as of Dec. 31, 1937, as follows: Open-hearth ingots, 63,524,356 gross tons; bessemer ingots, 6,440,000 gross tons.

Percentages of capacity for the first six months of 1937 are calculated on weekly capacities of 1,188,452 gross tons for open-hearth ingots, 121,308 tons for bessemer and 1,309,760 tons total, based on annual capacities as of Dec. 31, 1936, as follows: Open-hearth ingots, 61,965,862 gross tons; bessemer, 6,325,000 tons; beginning July 1, 1937, on weekly capacities of 1,192,182 gross tons open-hearth ingots and 121,308 gross tons bessemer, total 1,313,490 gross tons; based on annual capacities as follows: Open-hearth ingots, 62,160,362 gross tons; bessemer, 6,325,000 gross tons.

PRODUCTION

■ STEELWORKS operations last week increased at six centers, remained stationary at five and declined slightly at one. The national rate is estimated at 61.5 per cent, up 4 points.

Youngstown — A 3-point gain carried the rate to 66 per cent. Fifty-seven open hearths, 14 blast furnaces and three bessemers were in operation. Youngstown Sheet & Tube Co. suspended its bessemer Saturday night, which will lower the rate 3 points this week. Republic Steel Corp. will drop two open hearths this week, but Youngstown Sheet & Tube and Carnegie-Illinois Steel Corp. each will add one.

St. Louis — An advance of 6 points to 51.5 per cent resulted from lighting two more open hearths at an east side plant.

Detroit—Unchanged from revised rate of 82 per cent the preceding week. One Great Lakes open hearth is being used to melt cast scrap for refining in other furnaces, supplementing blast furnace hot metal supply.

Birmingham, Ala. — Steady at 68 per cent, with 15 open hearths in operation. Lighting of another furnace by Republic Steel Corp. is expected soon. Tennessee Coal, Iron & Railroad Co. has resumed night shift in Edgewater coal mine after suspension since May 10.

Cincinnati — With 12 of 16 open hearths producing, the rate is unchanged at 75 per cent, highest for the year.

Central eastern seaboard — Production balances demand, the operating rate continuing at 35 per cent.

Pittsburgh — Up 3 points to 48 per cent, as most producers increased schedules.

Wheeling — Heavier schedule by one producer, equaling its September level, brought a rise of 5 points to 64 per cent.

Buffalo — Removal of one open hearth by an important producer caused a loss of 2 points to 49 per cent.

New England—Advanced 1 point to 72 per cent.

Cleveland — For the second week production held at 77 per cent. The same schedule is planned for this week.

Chicago — Increased 1.5 points to 58 per cent, as several producers enlarged production slightly.

■ Manufacturers of metal doors, shutters, window sash and similar products operated 154 establishments in 1937, compared with 134 in 1935, an increase of 14.9 per cent, according to the biennial census.

Eastern Producers To File Briefs On Wage Recommendations

■ EASTERN steelmakers last week were studying the public contract board's wage recommendations with a view to filing briefs with the labor department before the Nov. 28 deadline.

The board, pursuant to the Walsh-Healey act, recommended base wages of 62.5 cents an hour in the North, 45 cents in the South, for companies supplying steel to the government. The report is not final and objections or approval by the industry will be considered before a decision is made.

Most eastern steelmakers are paying common labor a minimum rate of 56.5 cents an hour, a rate they believe justified by production costs in the area. These companies are expected to make a presentation to the board supplemental to one made earlier this year.

However, if the recommended wage rates are made effective, it is estimated not more than 5 to 10 per cent of eastern steelworkers will be affected.

While nearly 95 per cent of the industry would come under the scope of the proposed wage standards, comparatively few companies would be required to boost minimum wage rates, because most workers already are receiving the wages recommended, or more.

Of all common laborers in the iron and steel industry—covered by the study of the public contracts board—it is reported 54.6 per cent are paid 62.5 cents an hour. Skilled and semi-skilled workers, of course, receive a higher rate and would not be affected by the recommendation. Average hourly wages of all steelworkers have been slightly above 83 cents an hour.

Few Laborers Would Get Raises

In general it is estimated fewer than 15,000 laborers would receive increases; and these, from 2 to 10 cents an hour more than they now receive, if the recommended wages are made effective.

Producers coming under the proposal include makers of all important iron and steel products except tin plate, tin mill black plate and terne plate.

Basis for the board's recommendations was provided by public hearings July 25-26, supplemented by wage information submitted later by iron and steel companies. Ninety-nine companies operating 234 plants and employing 313,062 workers during the summer of 1938, reported wage data. The board considered this a good representation.

"The coverage as to production capacity and size of producing units is also adequate," states the board.

"For reasons of convenience companies with an annual capacity of over 1,000,000 tons may be classified as large; companies with a capacity of over 300,000 tons per year as medium, and companies below that figure be classified as small. The wage sample is found to be in complete coverage of the large companies, with the exception of one company which produces steel for its own use in subsequent fabrication. Fifteen companies are medium size. Nine of these have submitted their wage data. The wage data as to three others have been supplied by the Steel Workers Organizing committee. The minimum wage paid by one other concern is also known. There are thus only two companies as to which there are no wage data of record, and one of these produces steel for its own use in subsequent fabrication.

"There is in the record evidence as to the rates of pay of 21 out of 48 companies listed as small. The information as to the wages paid covered all the significant areas in which the industry is located.

"The first concentration of common labor rates in the industry appears at 45 cents. Seven plants employing 7631 workers pay that minimum and 988 workers are paid at the minimum. Sixteen concerns pay less than 45 cents an hour but they employ only 6038 employes, with 1256 at the base rate.

"The wage rate in the plants paying less than 45 cents is distributed by small money intervals and varies almost by plant.

"The next significant wage is 56.5 cents. Forty-six concerns pay more than 45 and less than 56.5 cents per hour, and employ 19,466 wage earners, paying 2782 at the base rate. There is no pronounced concentration at any point within the range. Twenty-one companies employing 38,947 employes, with 3965 at the base rate, pay 56.5 cents an hour. Twelve and four-tenths per cent of all the workers in the wage sample, and 14.7 per cent of all the workers classified in the sample as common laborers work in plants paying this minimum.

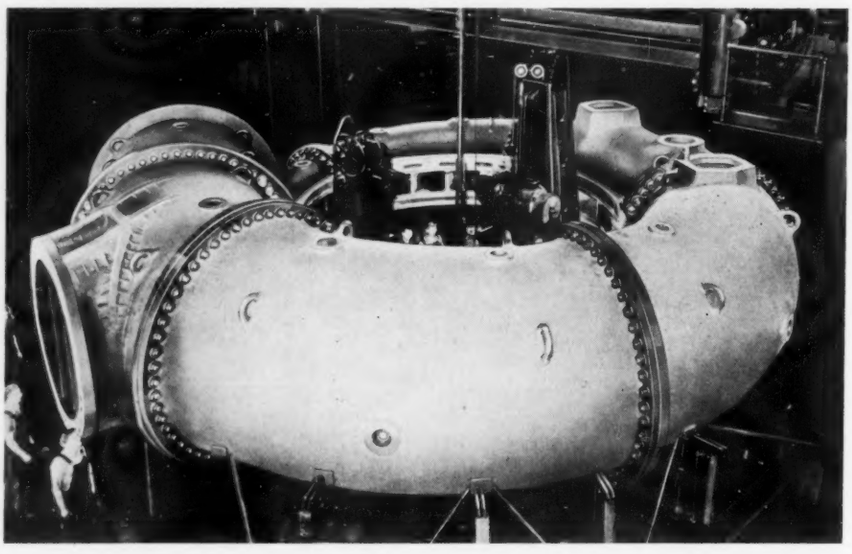
101 Concerns Pay 62.5 Cents

"The next pronounced concentration of wages is at 62.5 cents an hour, although 34 concerns employing 33,699 employes at the base rate, pay between 56.5 and 62.5 cents per hour. One hundred one concerns employing 200,466 workers, with 14,669 workers at the base rate, pay 62.5 cents. These 101 plants employ 64 per cent of all the workers in the wage sample and 54.6 per cent of all the common laborers.

"The largest concentration of workers at 45 cents an hour is found

(*Please turn to Page* 102)

Steel Casing To House Giant Turbine



■ **This cast steel casing, weighing 210 tons, will house one of the fifteen 115,000-horsepower turbines for Boulder dam. For convenience in shipping, the casing was built in six sections in Allis-Chalmers Mfg. Co.'s plant, Milwaukee, and machined on the company's 40-foot boring mill. Six of the massive turbines, each requiring 26 railroad cars to ship, were installed recently at the dam. Two more are under construction in the Allis-Chalmers shops**

FINANCIAL

PITTSBURGH STEEL ACQUIRES NATIONAL SUPPLY SHARES

■ PITTSBURGH Steel Co., Pittsburgh, has acquired 120,000 common shares in National Supply Co., Pittsburgh, manufacturers and distributors of oil and gas well and pipe line supplies, drilling machinery and other oil country goods.

The stock purchase is on an exchange basis through Pennsylvania Industries Inc. whereby that concern receives common and prior preferred in Pittsburgh Steel for the National Supply common. Henry A. Roemer, Pittsburgh Steel president, stated it was the desire of his company to acquire a small stock interest in one of its customers for investment, added that no further acquisition of National Supply stock was contemplated.

An important Pittsburgh Steel product is seamless steel tubing and blanks or pierced billets for seamless tubes.

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Eastern Rolling Mill Co., Baltimore, reports a net loss of $75,311 for third quarter, against a net profit of $19,664 in the period last year. In the 12 months ended Sept. 30 net loss totaled $311,152, while in the preceding year a net profit of $227,988 was reported. For the nine months ended Sept. 30 the indicated net loss amounted to $267,920, contrasted with a net profit of $164,899 in the same 1937 period.

•

International Nickel Co. of Canada Ltd., Copper Cliff, Ont., had a net profit of $7,552,123 in the third quarter equal to 48 cents a share on common stock, compared with a net profit of $6,618,486 or 42 cents per share, in the second quarter. Net profits for the first nine months totaled $24,284,374, compared with $36,944,380 for the period in 1937.

•

In its annual statement for the fiscal year ended Aug. 31, American Forging & Socket Co., Pontiac, Mich., shows a net profit of $10,723, after making an allowance of an estimated provision for federal income tax of $550. Earned surplus as of Aug. 31 amounted to $289,442.

DIVIDENDS DECLARED

National Steel Corp., Pittsburgh, has declared a dividend of 25 cents per share on 2,168,117 shares of capital stock outstanding, payable Dec. 23. This is the same amount paid Sept. 30.

M. A. Hanna Co., Cleveland, has declared a regular quarterly dividend of $1.25 per share on the $5 cumulative preferred stock, payable Dec. 1.

Acme Steel Co., Chicago, has declared a quarterly dividend of 25 cents a share on common stock, payable Dec. 12. The same amount was paid Sept. 12.

Allis-Chalmers Mfg. Co., Milwaukee, declared a dividend of 37½ cents on common stock, payable Dec. 22. A like amount was paid Sept. 30.

MARINE

$1,000,000 EQUIPMENT ORDERS PLACED

■ ORDERS for nearly $1,000,000 worth of propulsion and other marine gear for the Standard Oil Co. of New Jersey have been received by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Material will be used in outfitting a fleet of 12 new twin-screw oil tankers, embodying national defense features.

The tankers will be capable of 18 knots an hour and will be propelled by high pressure steam turbines developing 13,500 shaft horsepower. Each vessel will have an overall length of 551 feet and a cargo capacity of 145,000 barrels.

The fleet will be built over the next three years in yards of the Bethlehem Shipbuilding Corp. Ltd., Federal Shipbuilding & Dry Dock Co., Sun Shipbuilding & Drydock Co. and the Newport News Shipbuilding & Dry Dock Co.

MORE SHIPS BUILDING THAN MONTH OR YEAR AGO

Shipwork showed modest improvement in October, according to the American Bureau of Shipping. Vessels under construction to its classification Nov. 1 involve aggregate gross tonnage of 459,775, against 448,365 on Oct. 1. On Nov. 1, 1937, aggregate gross tonnage was 315,220.

More impressive is the improvement in number of vessels. Nov. 1 construction included 129 ships—51 seagoing and 78 miscellaneous—against 93 ships Oct. 1. On Nov. 1, 1937, 102 vessels were under construction.

New Ternstedt Trenton Division To Be Dedicated

■ General Motors Corp. this week will formally open its new Ternstedt Trenton division, Trenton, N. J., where body hardware and fittings will be manufactured for shipment to assembly plants in the East and South.

Dedication will be featured Nov. 15 by a civic luncheon arranged by the Trenton chamber of commerce. On Wednesday, only families of the plant's 1500 workers will be admitted, and on the final three days of the week the doors will be open to the public. For description of plant and equipment see page 57.

AVIATION

AIRPLANE BUILDER AIDS TRAINING FOR FOREMEN

■ GLENN L. MARTIN CO., Baltimore, manufacturer of airplanes, has furnished a faculty of 20 representatives from its engineering and tool design departments to conduct Saturday morning classes in blueprint reading at Baltimore Polytechnic institute. More than 400 students are attending the course. The procedure is aimed to help meet threatened shortage of foremen and other shop executives which the aviation industry would meet in further acceleration of the national defense program.

ORDERS STAINLESS STEEL AIRPLANE EQUIPMENT

Edward G. Budd Mfg. Co., builders of lightweight stainless steel transportation equipment, has received an order for 250 each of rudders, stabilizers, elevators and fuel tanks from the Piper Aircraft Corp., Lock Haven, Pa. The parts will be used in the new model J-4 Piper plane. Engineers stated use of stainless steel in this type of construction would reduce materially weight of the aircraft structures, and also would resist salt water spray.

Autos Take Five-Eighths Of All Alloy Steels

■ How improvement in automobiles has demanded suitable steels, is pointed out in the current issue of *US Steel News*, United States Steel Corp. employes' magazine. The issue is timed to coincide with introduction of 1939 model cars and is published as an automobile number.

In 1911 the Society of Automotive Engineers published its first list of "compromise analyses." It contained 11 alloy steels. The 1938 list contains 85 alloy steels and even this list is far from complete. Today the automobile industry consumes five-eighths of all alloy steel produced, according to the publication.

$1,250,000 Marked for Republic Improvements

■ Nearly $1,250,000 has been appropriated by Republic Steel Corp. for immediate improvements and expansions in a number of its plants.

The largest single appropriation is for equipment at its Gadsden, Ala. plant for manufacturing welded wire mesh and bending building-reinforcing material.

Youngstown, Warren and Cleveland also will benefit from expenditures for plant equipment improvements.

MEN OF INDUSTRY

■ GEORGE WHEELER WOLF'S appointment as president, United States Steel Products Co., effective Jan. 1, was announced last week by United States Steel Corp. of Delaware. Steel Products is the Steel corporation's export medium.

Mr. Wolf succeeds George C. Scott, who is retiring from active service but will remain in an advisory capacity.

Mr. Wolf is at present operations manager of General Motors' overseas operations. With General Motors 13 years, ten of which were spent abroad, he was successively managing director of General Motors Argentina; General Motors Poland; General Motors G.m.b.H., Germany; and General Motors Peninsular at Barcelona, Spain.

In January, 1936, he returned to the United States as vice president, General Motors export division, in charge of production and engineering, with headquarters in Detroit.

He was born in Pittsburgh, 1892, and was appointed to the Naval academy in 1909. He was graduated in 1913 and served in the navy until his resignation in 1926 as lieutenant commander. In 1917-18 he commanded a submarine in the European war zone. At the close of the war he was awarded the Navy Cross for distinguished service overseas. In 1919 he was selected by the navy department for post graduate instruction in ordnance and gunnery and in that connection specialized in metallurgy at Lehigh university.

♦

Robert A. Peterson has been appointed superintendent, salvage department, Gary works, Carnegie-Illinois Steel Corp. Other appointments include J. Donald Rollins as assistant chief estimator in the engineering department, and Robert E. Dittrich as assistant to division superintendent of coke plant and blast furnaces.

George W. Wolf

Mr. Peterson started with corporation subsidiaries in 1934 as rolling mill adviser for American Steel & Wire Co. In 1936 he joined the Gary works as assistant superintendent, merchant wheel and axle mills, and a year later became superintendent, merchant bar mill.

Mr. Rollins also has been with corporation subsidiaries since 1934, joining Carnegie-Illinois in 1936 as an estimator.

Mr. Dittrich started as a clerk in the industrial relations department at Gary works in 1930, remaining in that capacity until his present promotion.

♦

Chester H. Gibbons, formerly stationed at the plant of Baldwin-Southwark Corp., Eddystone, Pa., has been transferred to the Ohio district in charge of sales of products of the Southwark division. He succeeds A. Q. Davis, recently appointed shop superintendent of the corporation.

♦

Thomas W. Kennedy has resigned as president and general manager, Mystic Iron Works, Boston.

♦

George Reindel Jr. has been appointed district manager at Detroit for Emerson Electric Mfg. Co., St. Louis.

♦

Earle C. Derby, president and treasurer, Buckeye Stamping Co., Columbus, O., has been elected president, Battelle Memorial institute, Columbus.

♦

L. L. Hurd, associated with the sales department of Buffalo Bolt Co., North Tonawanda, N. Y., since September, 1934, has become assistant sales manager.

♦

D. E. Perkins has been placed in charge of pig iron, coke and foundry specialty sales in the Detroit area for the Kerchner-Marshall Co., Pittsburgh and Cleveland.

♦

Russell G. John, formerly special representative, American Steel Band Co., Pittsburgh, has been appointed district manager of the company's New York office, recently opened at 122 East Forty-second street.

♦

Charles A. Reagan, formerly salesman and buyer, Erman Howell & Co., Chicago, has been confined in Hines Veterans hospital, Hines, Ill., with arthritis, but is recovering and expects to be out soon.

♦

Rolland C. Allen, executive vice president, Oglebay, Norton & Co., Cleveland, has become a member of the board of trustees, Battelle Memorial institute, Columbus, O. Mr. Allen's appointment fills the vacancy created by the death of

Robert A. Peterson

J. Donald Rollins

Robert E. Dittrich

Joseph H. Frantz, late president of the board.

♦

C. E. Herington has been appointed director of publicity and advertising manager, Meehanite Research Institute of America, Pittsburgh. He will conduct an advertising and publicity program for Meehanite metal. Mr. Herington previously was identified with M. K. Melott & Co., Pittsburgh, industrial public relations counsellors.

♦

Roy J. Leckrone has been named chief designing engineer, Lewis Foundry & Machine division, Blaw-Knox Co., Pittsburgh. Mr. Leckrone has been identified with various fields of the steel and allied industries since leaving the University of Pennsylvania. He spent three years in Russia designing and building American-type rolling mill

Roy J. Leckrone

equipment. In his new position he will serve in both a sales and engineering capacity and will be located at the company's plant at Groveton, Pa.

♦

J. H. Hillman Jr. has been elected president, Hunter Steel Co., Pittsburgh. Other newly elected officers are: Executive vice president, Albert P. Meyer; vice president, A. M. Kennedy; secretary-treasurer, J. F. Woessner. New directors include: Messrs. Hillman, Meyer, Kennedy, G. E. Dignan and W. L. Affelder.

♦

Miss Catherine A. Murphy rounded out 30 years of continuous service with Brown-Wales Co., Boston, Nov. 2. Surrounded by the office force, Quincy W. Wales, president, presented her with a gold wrist watch. Starting as a stenographer she finally became manager of the company's steel department.

♦

Wilder A. Chapman has been appointed manager of laboratories, Robert W. Hunt Co., Chicago. Following association with the Solvay Process Co., Mr. Chapman became affiliated with the Delaware, Lackawanna & Western railroad, remaining there six years. He joined Skinner & Sherman Inc., Boston, in 1924, and was secretary, director and clerk of that firm since 1930.

C. E. Herington

♦

L. A. Schmidtt, chief engineer, National Tool Co., Cleveland, has been elected vice president. David Ford, president, Central Foundry Co., New York; Louis Jubenville, Detroit, and Albert A. Houck, Rochester, N. Y., have been elected directors, replacing on the board L. M. Prosser, office manager and treasurer; Gerald Kochenderfer, sales manager, and Edwin Sweet, of Rochester.

♦

Ralph J. Stayman has resigned as manager of warehouse sales, Jones & Laughlin Steel Corp., Pittsburgh. He has been active in the warehouse industry many years, starting with Joseph T. Ryerson & Son Inc., Chicago. He left Ryerson's to become manager of Jones & Laughlin's Chicago office and warehouse. Subsequently he was transferred to Pittsburgh and there directed further expansion of the company's warehouse service, including warehouses at Long Island City, N. Y., Cincinnati, Detroit, Memphis, Tenn., and New Orleans. He also directed merchandising of Jones & Laughlin products sold to the construction industries, especially fabricated structural steel output of the Keystone works at Pittsburgh, and sheet steel piling.

Ralph J. Stayman

Since its reorganization four years ago, he has been a member of the executive committee, American Steel Warehouse association, and has served the association as president and treasurer. He is a director, American Institute of Steel Construction. No announcement of his future plans has been made.

DIED:

■ CHARLES E. ST. CLAIR, 52, works manager, Sivyer Steel Casting Co., Milwaukee, Nov. 5 in Springfield, O., while on an inspection tour of foundries in Ohio.

♦

Constantine F. Weimer, 50, founder and president, Weimer Welding & Cutting Co., Milwaukee, Nov. 4.

♦

Jacob J. Walther, vice president, Dayton Steel Foundry Co., Dayton, O., in Dayton, Oct. 20.

♦

John F. Ohmer, 81, president and founder, Ohmer Fare Register Co., Dayton, O., Nov. 4.

♦

William Preikschat, 70, retired assistant manager, Calumet shops, Pullman Co., recently at his home in Chicago.

♦

Ralph Butler, former purchasing agent, Donner Steel Co., and a director, Electro Refractories & Alloys Corp., Buffalo, in that city, Nov. 2.

♦

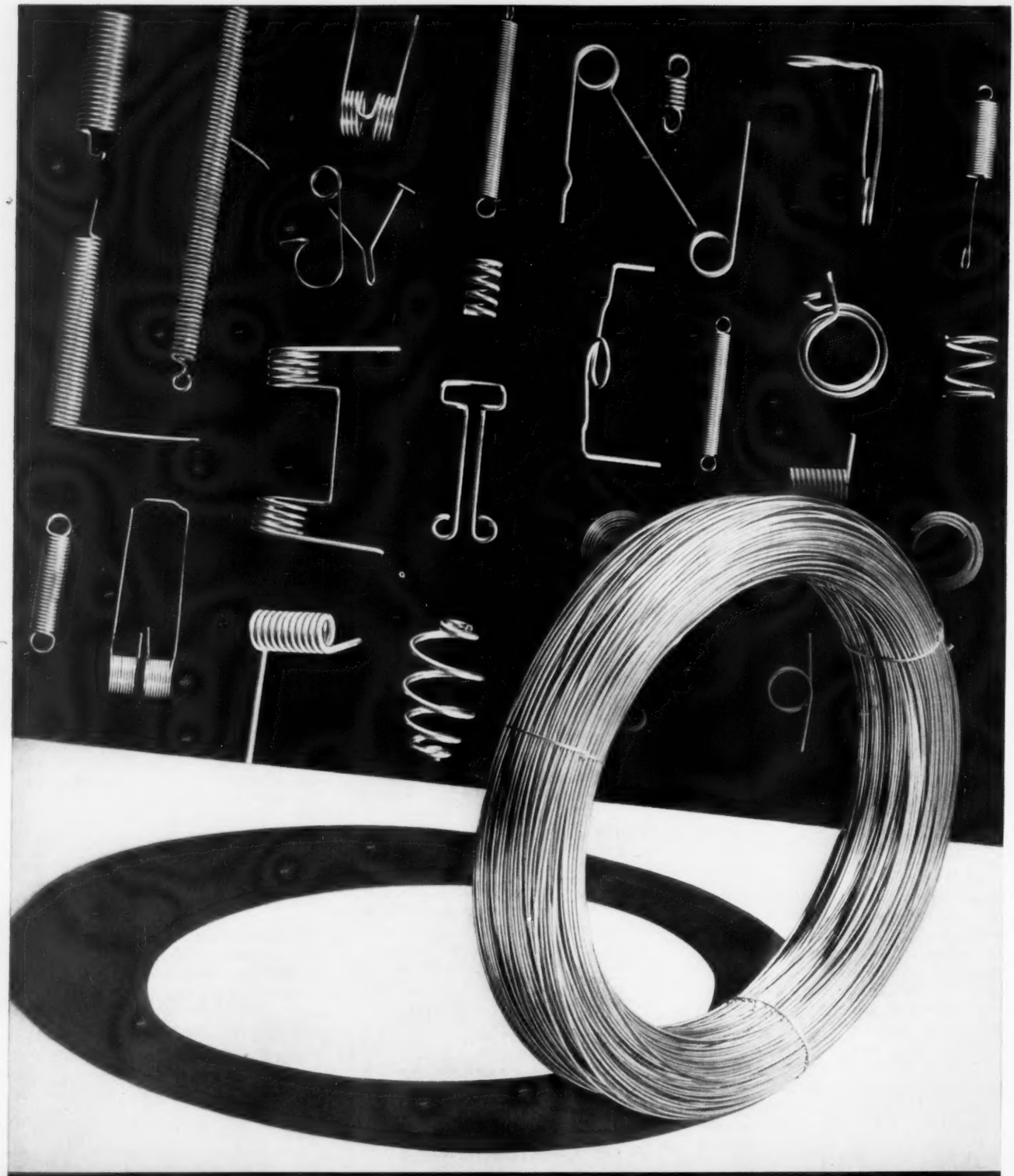
Harry Birkenstein, 62, formerly vice president, S. Birkenstein & Sons, Chicago, in that city, recently. He had been identified with the nonferrous metal industry in Chicago 46 years, retiring two years ago.

♦

John M. Manthei, 53, well known throughout the Marquette, Mich., ore mining region, Oct. 28 in Newberry, Mich. For a number of years he was superintendent, Lake Shore Engine Works, Marquette.

♦

John B. Downes, 89, at his home in Steelton, Pa., Oct. 9. For 27 years preceding his retirement in 1913, Mr. Downes was superintendent, rail and blooming mills, Pennsylvania Steel Co., now the Steelton plant of Bethlehem Steel Co.



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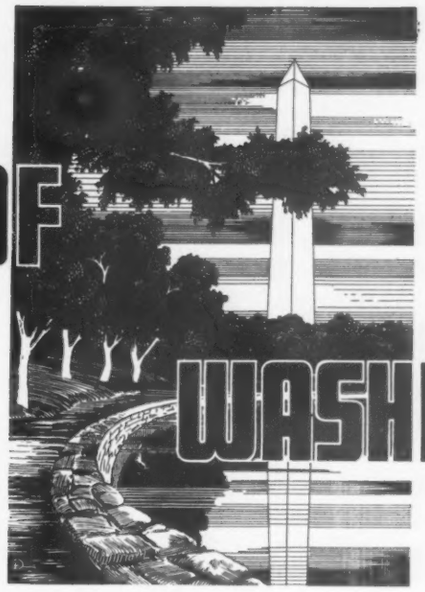
WINDOWS OF WASHINGTON



WASHINGTON

■ THE NATIONAL economic committee which is soon to begin hearings in connection with the monopoly situation intends, it is said, to make a report to the forthcoming session of congress, probably early in January.

Just what this committee can report is problematical, but those who are on the inside believe the report will simply be a mask for asking for additional appropriations. Also the economic committee seems to be pointing toward the establishment of a bureau of industrial economics.

The story goes that Leon Henderson, committee secretary, would not be adverse to heading the proposed bureau. There is talk that the committee may urge the bureau on congress in view of the fact the committee itself will not even be able to scratch the surface of the monopoly situation in two or three years.

Extended Investigation Seen

It is contended the job will be a long one and for that reason there should be a permanent set-up rather than a temporary committee. This story may be spreading around Washington with malice aforethought in an effort to get members of congress to think along "proper" lines.

Secretary of Commerce Roper, as long as three years ago, suggested a bureau of industrial economics to parallel the bureau of agricultural economics in the department of agriculture. Of course, he was recommending this as a new bureau for his own department, but if such a bureau should be created, it is a foregone conclusion it would not be placed in the department of commerce.

The securities and exchange commission announced last week two appointments to its monopoly study division. Gerhard Gesell has been named chief attorney, and Ernest J. Howe, chief financial adviser for the investigation of insurance companies.

BY L. M. LAMM
Washington Editor, STEEL

Mr. Gesell, a native of New Haven, Conn., has had a varied career with the commission as a trial and enforcement attorney. Recently he served as counsel for the commission in the Richard Whitney case. He is a graduate of Yale and the Yale law school.

Mr. Howe is a native of Denver, and a resident of South Orange, N. J. He has been in the investment banking business for the past 15 years, and has been associated with leading investment banking firms. His work in this field has brought him into active contact with the investment policies of insurance companies. From 1934 to 1936 he served as special financial representative to the federal housing administration in Washington.

WAGE-HOUR DECISIONS CONFUSING TO INDUSTRY

There is considerable speculation among industrial representatives in Washington relative to the "horseback" opinions which are being handed down by the Andrews wages and hours division. The contention, among those who are following the situation closely, is that the decisions are already causing confusion in industry.

The question came up last week among the many hundreds which are being submitted to the Andrews organization relative to raw materials entering plants from outside the state in which they are located when the plant itself may be doing an intrastate business. Calvert Magruder, general counsel for the division, in discussing this question said:

"It is our opinion that employes engaged in manufacturing or processing goods for consumption within the state of manufacture or process are not engaged 'in commerce or in the production of goods for commerce,' even though raw materials are brought in from outside the state. Therefore, such employes would not seem to be entitled to the benefits of the act. This would, of course, be true only where none of the products of the plant move in interstate commerce."

Invites Confidential Complaints

The wage and hour division announced last week that it would hold confidential all complaints against employers charged with evasion of the act. The establishment of the procedure for handling complaints became known with the issuance of a complaint form for the use of the division's field representatives.

The form, released by Administrator Andrews, is headed "confidential" and will require, first, the establishment of the fact that the business complained of comes under the act. A full report of the details of the alleged violation is also provided for, through which investigators of the division will be aided in a speedy determination of the guilt or innocence of the employer in each case.

Complaints will be taken over the telephone. Anonymous complaints, if the facts they recite appear to transgress the law, will also receive attention.

The field force is a small one but, through co-ordination at Washington, prompt investigation is expected on all complaints. Copies of any complaints received will be transmitted to Washington daily by local

representatives, under the rules set up.

GOVERNMENT SPENDING TO REACH PEAK IN SPRING

Tabulations made by government experts indicate the peak of the government spending will be reached in the spring. Their figures indicate that by Jan. 1 most of the government work-producing projects should be under way.

During the present fiscal year, which began July 1, will be spent some $9,000,000,000, the largest peace-time budget in history. In addition, the RFC has lending powers totaling many millions.

Bids will be received by the navy department Oct. 19 for three new battleships having a total cost of some $210,000,000. Navy department officials say that while it is possible the keels may not be laid for six months or so, the purchase of steel and other materials will proceed almost immediately. While the cost of the ships will not be spent in any one year, it now is estimated the navy will spend $204,000,000 during the current fiscal year for ships and airplanes.

It has been estimated by PWA officials that one job on one of its projects creates two jobs in the private industries which supply the materials, and all through the coming winter material orders are expected by officials to flow in increasing volume which naturally will stimulate private employment.

DEPARTMENT OF JUSTICE ON "CONSENT DECREES"

Announcement was made last week by the department of justice that it had dropped its criminal proceedings under the antitrust laws against the Chrysler and Ford motor companies in view of the fact that both have entered into consent decrees regarding automobile financing. However, the department says it will continue to prosecute General Motors, which has not entered similar decrees.

"General Motors' failure to propose an acceptable plan" for a consent decree was given by Assistant Attorney General Thurman Arnold as the reason. All three companies and their automobile finance affiliates were indicted by a federal grand jury at South Bend, Ind., for restraining competition in the automobile finance field.

The department's announcement signed by Mr. Arnold and approved by Attorney General Cummings, explained that acceptance of the consent decrees by Ford and Chrysler involves no admission of guilt. The department, it was stated, "believes these defendants to be guilty of the antitrust law violations charged in the indictments," but it has not heard the defense and therefore the decrees cannot be regarded as an adjudication of guilt.

"The voluntary co-operation of business in achieving the purpose of the Sherman act must not be refused," the department said. "The test of whether a *nolle prosse* will be recommended on the basis of a consent decree is whether that decree accomplishes more in effectuating the purpose of the act than could be obtained through the criminal court."

The government had charged a conspiracy to compel automobile dealers, by pressure and threats, to finance cars through the particular finance company with which the manufacturer of the car was affiliated. It was alleged that three-fourths of all the automobile financing in this country was handled by affiliates of the three large motor corporations. Competition of some 375 independent finance companies was hindered, it was asserted.

The decrees volunteered by Ford and Chrysler, it was pointed out, eliminated "all of the coercive practices" complained of and obligate the two companies under court order to afford equal opportunity to all competitors and to refrain from "exorbitant rates and harsh collection methods."

36 STATES REPRESENTED AT LABOR LAW CONFERENCE

Governors of 36 states have designated delegates to attend the fifth National Conference on Labor Legislation, to be held here Nov. 14-16.

Reports will be made by the delegates on programs for coming legislative sessions and needs of state labor departments, after Secretary of Labor Perkins opens the conference. Reports of standing committees on wages and hours, industrial home work, child labor, wage payment and wage collection, extension of labor law protection to all workers, prevention and compensation of industrial accidents and diseases, apprenticeship, relations between organized labor and labor law administrators, strengthening state labor departments and co-operation of federal and state labor departments, will be made Nov. 15.

Plans for state co-operation in the administration of the fair labor standards act will be discussed by Administrator Andrews and Miss Katharine F. Lenroot, chief of the children's bureau, on the closing day of the conference.

FAIL TO COLLECT

United States Supreme Court denied the petition of Agnes Gliwa in behalf of herself and other persons for a review of lower court decisions in their unsuccessful suit to collect damages from Pittsburgh district steel companies. They were seeking more than $1,000,000 on the ground that factory wastes reduced property valves.

FEDERAL STEEL PURCHASES

During the week ended Nov. 5, the government purchased $147,092.96 of iron and steel and their products. These contracts were let under the Walsh-Healey act. The items include: Truscon Steel Co., New York, $17,978.00; U. S. Pipe & Foundry Co., San Francisco, $20,196.48; Bethlehem Steel Co., $18,680.00; Hansell-Elcock Co., Chicago, $23,680.00; Republic Structural Iron Works, Cleveland, $30,818.48; E. G. Budd Mfg. Co., Philadelphia, $23,810.00; Ruff Hardware Co. Inc., Columbia, S. C., $11,930.00.

New Narrow Strip Mill In Chicago District

■ Thompson Wire Co., 41 Mildred avenue, Boston, has started operations in its new plant at 9470 King street, Franklin Park, Ill., a suburb of Chicago. It is equipped with modern annealing furnaces for spheroidizing carbon steels. It will specialize on narrower sizes of low and high carbon strip steel, the widest which can now be rolled being 10-inch.

Equipment is being installed for hot tinning, lead coating and cadmium plating of strip steel. This will be put into operation in a few weeks.

Bertram Bredy has been appointed general manager of the Chicago division; G. Eklof, mill superintendent; and Ernest Trantin, assistant superintendent. The company now operates three plants, those at Boston and Chicago producing cold-rolled strip and flat wire and that at Worcester, Mass., specializing on round, small flat wires, tempered wires and shaped wires.

Ancient, Modern Uses of Copper in Fair Exhibit

■ Copper and Brass Research association, 420 Lexington avenue, New York, will illustrate the story of copper from prehistoric days by its exhibit in the metals building at the New York World's Fair in 1939.

This will be done by animated dioramas, murals and exhibits of present day uses. A feature will be an animated copper "atom." Dioramas will show primitive workers forming spearheads, first use of copper; casting doors of the temple of Karnak; Cellini's workshop, and Pearl street station in New York, the world's first electric generating unit. Other exhibits will portray copper mining methods and high tension transmission by copper wires.

MEETINGS

CONFERENCE BOARD IN CLEVELAND THIS WEEK

■ BUSINESS leaders and economists will review domestic and foreign business and political developments at the 210th meeting of the National Industrial Conference board, Hotel Cleveland, Cleveland, Nov. 17. Four roundtable discussions in the afternoon will be devoted to: "Pump Priming and Its Consequences"; "Current Business Outlook"; "The Government's Economic (Monopoly) Inquiry"; and "Industry's Stake in Public Relations." C. J. Stilwell, vice president, Warner & Swasey Co., Cleveland, and A. T. Brown, vice president, Caterpillar Tractor Co., Peoria, Ill., will participate in the latter discussion.

Four addresses on international topics are scheduled for the evening.

BRITISH GROUP TO REVIEW NONDESTRUCTIVE TESTING

Methods of nondestructive testing will be discussed at a meeting of the British Joint Committee on Materials and Their Testing in London, Nov. 25, under auspices of the Institution of Electrical Engineers. Papers to be presented by authors representing Great Britain, the continent of Europe and the United States, will deal with magnetic and electrical methods, X-rays and gamma rays, acoustical and general methods.

European papers include: "Nondestructive Testing of Materials by Electrical and Magnetic Methods," by Dr. A.P.M. Fleming and B. G. Churcher, Great Britain; "Nondestructive Testing Based on Magnetic and Electrical Principles," by Dr. R. Berthold, Germany; "Radiography—An Aspect of Nondestructive Testing," by Dr. V. E. Pullin, Great Britain; "Industrial Radiography on the Continent of Europe," by J. E. de Graaf, Holland; "Acoustical and General Methods of Nondestructive Testing," by Dr. S. F. Dorey, Great Britain; and "Modulus of Elasticity and Damping in Relation to Study of Material," by Prof. Dr. Koster, Germany.

Experience in the United States will be reviewed in a paper prepared by a committee of the American Society for Testing Materials composed of N. L. Mochel, metallurgical engineer, Westinghouse Electric & Mfg. Co., Philadelphia; H. H. Lester, senior physicist, Watertown arsenal, Watertown, Mass., and R. L. Sanford, chief, magnetic section, national bureau of standards, Washington.

EXPECT LARGE ATTENDANCE FOR POWER EXPOSITION

More than 270 exhibitors will display their products in the thirteenth National Exposition of Power and Mechanical Engineering in New York, Dec. 5-10. The last show two years ago attracted 39,000 registered visitors and a larger attendance is anticipated this year.

Three floors in Grand Central Palace will be required to accommodate the exhibits which will feature the recent developments in the field of power and mechanical engineering. Exhibits will include: Stokers; boilers and heaters; steam plant apparatus; refractories and insulation; instruments; piping, valves, etc.; air conditioning and refrigerating apparatus; electrical apparatus; transmission machinery; materials handling equipment; metals; specialties and miscellaneous machinery.

Concurrently with the exposition, the American Society of Mechanical Engineers will conduct its annual meeting at the Engineering Societies building, Dec. 5-9, and the American Society of Refrigerating Engineers its annual meeting at the Commodore hotel, Dec. 6-8.

NATIONAL FOUNDERS WILL ATTACK INDUSTRY PROBLEMS

Important economic matters confronting the foundry industry will be considered by the National Founders' association at its forty-second annual convention at the Waldorf-Astoria hotel, New York, Nov. 16-17. Program for the convention includes business session morning and afternoon of the first day and morning of the second.

"Wagner Law and British Law" will be discussed by John C. Gall, counsel, National Association of Manufacturers, at the opening session. Subjects and speakers at the afternoon session are: "What Can We Learn from Europe's Workers?" by Whiting Williams, Cleveland; "Observations on the American Tax Situation," by Fred R. Fairchild, professor of political economy, Yale university; "Human Element Factor Controls Our Destiny," by Victor L. Short, president, Institute of Human Science; and "Outlook for Business," by W. W. Cumberland, economist, New York.

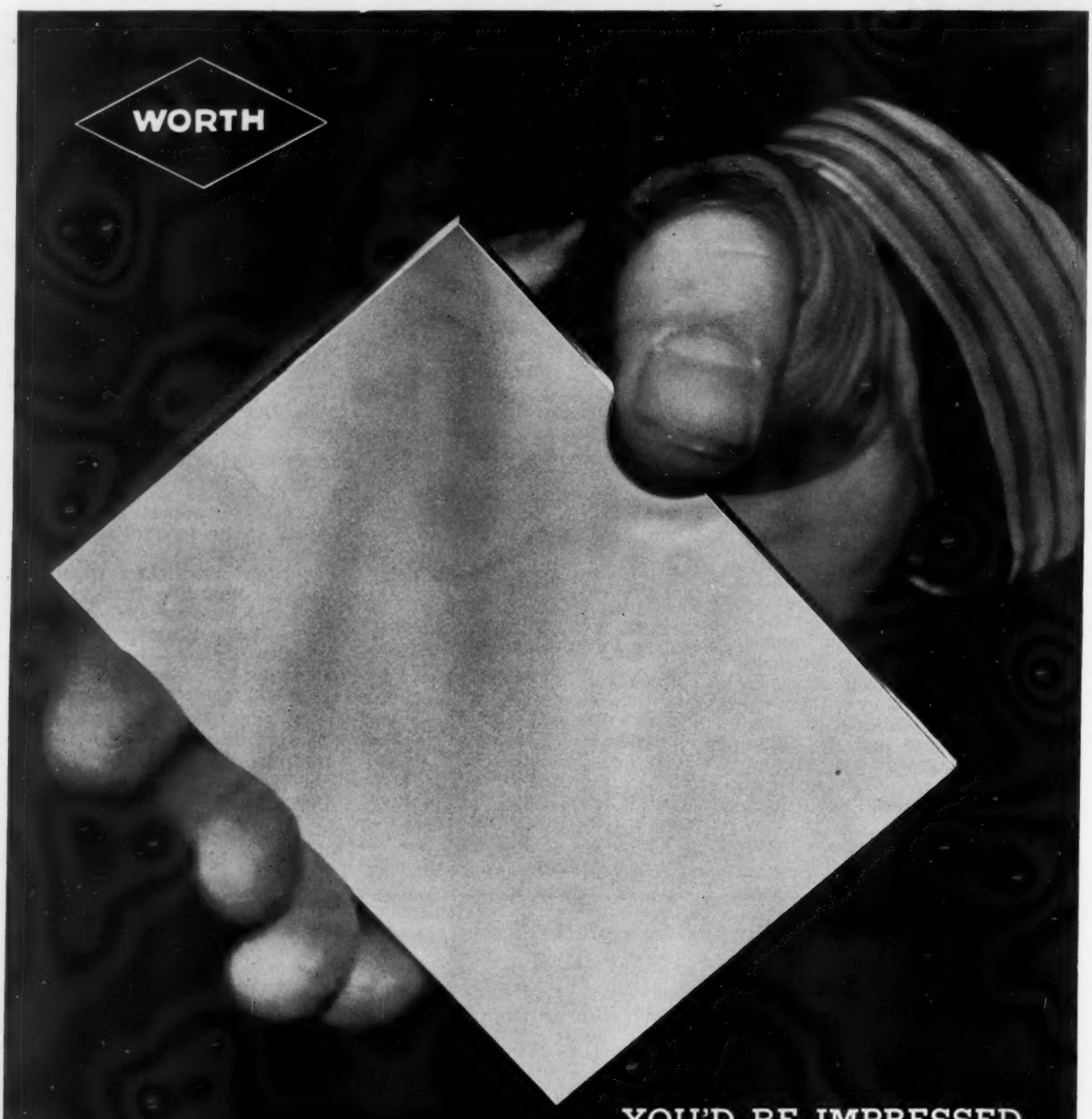
The concluding session will feature the following addresses: "This Thing Called Grievance," by George A. Seyler, works manager, Lunkenheimer Co.; "Value of and How to Get Good Housekeeping, Waste Elimination, Accident Prevention," by A. D. Lynch, industrial relations manager, J. I. Case Co.; and "Comments on Wagner Law and Wage-Hour Law," by Otto A. Jaburek, general counsel, National Founders' association.

SOUTHERN SUPPLY GROUP DEFERS DISTRICT MEETING

Southern Supply and Machinery Distributors' association has deferred its Southwestern district meeting in Shreveport, La., from Nov. 15-16 to Nov. 18-19. Headquarters will be at the Washington-Youree hotel. Alvin M. Smith, Smith-Courtney Co., Richmond, Va., secretary.

Transoceanic Clipper Completes Tests

■ **Manufacturer's tests on the first Boeing-314 Pan American clipper have been completed and the all-metal 74-passenger, 41½-ton ship now will be submitted to civil aeronautics authority tests. One hundred different precision instruments—regular equipment includes 58—were used to establish data and technique on landings and takeoffs, stability under various loading conditions, control surfaces and operation of power plant and equipment. Second of the fleet of six is nearing completion in the Seattle plant and the other four are close behind. For details concerning metals see STEEL, Jan. 24, p. 17 and Sept. 6, 1937, p. 28**



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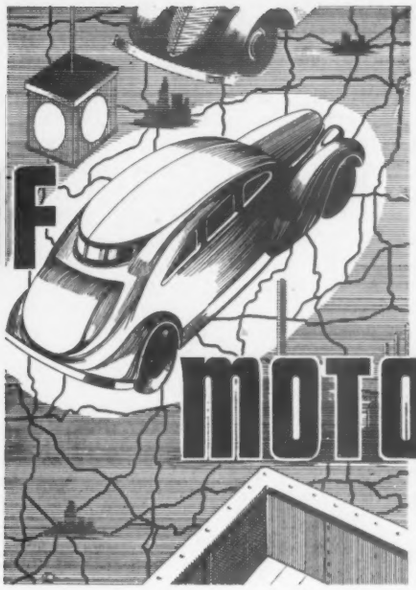
New York, N. Y., Wm. C. Dickey • Pittsburgh, Pa., McKee-Oliver, Inc. • St. Louis, Mo., Hubbell & Sharp • San Francisco, Calif., W. S. Hanford • Boston, Mass., Edward H. Lloyd • Houston, Texas, The Corbett-Wallace Corp. • Seattle, Wash., National Steel Sales, Inc. Los Angeles, Calif., Ducommun Metals & Supply Co. • Cleveland, Ohio, E. F. Bond • Detroit, Mich., H. L. Sevin • Portland, Oregon, National Steel Sales, Inc. • Montreal and Toronto, Canada, Drummond, McCall & Co., Ltd.

MIRRORS OF MOTORDOM



DETROIT

■ HAVE you an idea for a gadget or accessory which you think you could sell to the automotive industry and retire for life on the proceeds? Thousands of people have such brain waves and regularly approach the industry with proposals ranging from the barest sort of an idea to actual working models. Unfortunately, however, most of these inventors are doomed to failure—financially.

But the automotive industry recognizes that in this flood of ideas will be an occasional "oyster with a pearl" and therefore the various units of the industry are always receptive to suggestions, no matter how crude or impractical they may prove to be. This is of course a tactful position to take, as well, for an embryo inventor may be a prospective customer, so he must be treated with all the grace of a trained expert in public relations.

Eight thousand new ideas for automobile parts and accessories are submitted annually to the new devices section of General Motors Corp., a department which has been established for several years by the corporation to spend its entire time on this matter. Now in the files of this department are 90,000 ideas submitted by 70,000 individuals, indicating the high proportion of "repeaters."

Mail Brings Most Ideas

While 95 per cent of these suggestions are received by mail, there is a steady parade of people who think they "have something" to the quarters of this new devices section which are located on the top floor of the General Motors building here. Chairman of the group is genial John H. Hunt who receives callers in his office looking out over a broad section of the city that automobiles built. Assisting him is a staff of three engineers and a number of stenographers and clerks. The chairman and his three assistants

BY A. H. ALLEN
Detroit Editor, STEEL

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meet regularly with a committee of engineers from all divisions of the corporation and study over the workable suggestions received.

About 99 per cent of all suggestions and ideas must be discarded at once as being impractical, too costly or unpatentable. But this discarding must be done gracefully and this is where an astute job of public relations figures in prominently. It is no simple matter to tell a man he is crazy and at the same time not offend him.

Some of the ideas submitted border on the fantastic. Plans for perpetual motion machines are received regularly, for example. Other amateur inventors send in suggestions which indicate a pitiable lack of knowledge of automobile construction. For example, several times last year suggestions were received from individuals who reported they owned cars with coil springs on the front wheels and had figured out that coil springs could be used on rear wheels—not realizing Buick already used rear coil springs.

Many ideas are for extra gadgets to be installed in cars to increase

Ten Minutes To Rustproof Auto Bodies

■ Rustproofing of automobile bodies is accomplished automatically at the Fisher Body plant in Lansing, Mich., as the "bodies-in-white" pass along on conveyors through the spray-bonderizing tunnels, in which the steel is cleaned, rustproofed and rinsed before painting. The operation requires only 10 minutes on these Oldsmobile bodies

convenience of passengers. Most of these are weighed in the light of whether all prospective buyers would be willing to pay the extra cost involved to obtain such convenience, and since cost is such an important factor, these items are usually recommended as accessories, and then all the inventor has to do is find someone to manufacture his brain child and sell it to accessory retailers.

Among the major developments in automotive construction, the plan for which was submitted by an outside engineer, is the synchromesh transmission. Details of this system of gearing were brought to the new devices section, accepted and the engineer given a job in one of the corporation's plants.

It is emphasized in a pamphlet discussing activities of the new devices committee that its scope is limited to things for which patent protection is, or would be, offered for sale, no consideration being given to articles which are to be supplied to General Motors by some outside manufacturer. No device may be received by the committee "in confidence" and no confidential relation may be established with any submitter. And no agreement of any kind can be made until after a careful investigation following complete disclosure of the device.

May Reconsider Rejections

Changing conditions in the industry may result in the reconsideration of ideas previously rejected. Hence a live file of all submitted ideas is maintained, none being returned to the proponent.

Summarizing, the new devices section fills two main purposes: First, to make sure that any device submitted shall come to the attention of all persons in the corporation likely to be interested, and second, to save the time and money of the inventor in bringing his device directly before the proper people. Prospective inventors may obtain copies of a booklet discussing activities of the section by writing to the corporation.

■ POLITICS overshadowed all other news developments here last week and, following the somewhat surprising plurality of the Republican gubernatorial candidate, Fitzgerald, over the incumbent Democrat, Murphy, the manager of a local warehouse interest hurriedly scanned his order sheets to determine whether Republican money was coming out of hiding. His first check showed a relapse in orders, however, so he gave up the plan until a more normal tenor returned to business activities.

As Governor Murphy conceded defeat Tuesday evening, Homer Martin, UAW president, who was with him listening to returns, commented that the chief reason for the unseating of Murphy was the "labor holiday" which tied up the city of Lansing one day in 1937. Mr. Martin incidentally had no hand in this city-wide tieup which the governor made no attempt to quell.

Governor Murphy managed to roll up a heavy majority in Wayne county, but the one-sided plurality of Fitzgerald in out-state counties quickly canceled the edge which Murphy won in Detroit and environs. At that, Murphy's margin in the densely populated automotive centers was not nearly as large as expected, indicating that a turn away from the policies of the present administration is in full swing even among the ranks of WPA workers, relief clients and low-wage groups.

A Fitzgerald campaign promise was that violence and seizure of plants would no longer be tolerated in Michigan, and a test of this stand may come shortly. During the balance of the present Governor's tenure, labor probably will remain quiet, but many observers predict unrest after Jan. 1 when Fitzgerald takes office. On the other hand, it may well be that automobile workers in general have experienced a return to sanity and are convinced of the futility of such things as the sit-down of 1937.

In any event, plants are taking full advantage of the present calm in labor ranks and are pushing production with renewed fervor. Not for a long time has Detroit experienced the drive to get out parts and materials for assembly lines.

Output is being stocked to a certain extent, but retail sales are exceptionally healthy and the opening of the automobile shows last week was attended with considerable fanfare in leading cities, despite the fact many new models have been on the streets for upward of a month. Buick retail sales in October—in excess of 19,000—were the heaviest ever experienced, with the exception of October, 1926, and unfilled orders at the end of the month totaled over 16,000. Weekly production schedule for the plant in Flint passed the 6000-mark and is virtually at an all-time high for the company.

Statements of officials regarding the outlook for 1939 are uniformly but restrainedly optimistic. M. M. Gilman of Packard states: "We are convinced 1939 will be a better automobile year than was 1938 . . It has been necessary to revise production schedules upward . . . Orders have been pouring into plants in numbers exceeding expectations."

Chrysler Head Optimistic

K. T. Keller, president of Chrysler Corp., observes: "Indications are that the automobile output during the new model year, will range from 2,750,000 to 3,500,000, as compared with a probable total of 2,225,000 in 1938. I am optimistic, not only as regards the months just ahead, but also for the longer-term outlook of the automobile industry."

■ WE SEEM to be in the midst of a new era of advertising for automobiles. Copy writers, probably spurred on by the new twists which Buick admen have given to descriptive phrases in the past year, currently are attempting to outdo each other in painting the virtues of their wares.

Witness the following excerpts culled from a dozen or so new car announcements: "Moves like a honey-bee about its business . . . A silver streak, snaking ahead of traffic, silent as a shadow . . . No quiver or shiver shakes the luxurious body in its flight . . . It's fire on four wheels . . . Rhythmic ride on quadricoil springs . . . Hurricane power . . . Dancing sand soundproofing . . . Seats that breathe as your body moves . . . Drive in your shirtsleeves in a howling blizzard . . . No old-fashioned trunk bustle . . . As functionally beautiful as a marble in the Louvre . . . A study in beauty—if there ever was one." Wow!

The new Willys model will revive the name Overland, carried by some 2,500,000 cars built years ago by this Toledo, O., company, of which an estimated 500,000 are still in use.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,130
Feb.	300,810	383,900	202,589
March	438,943	519,022	238,598
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
Aug.	275,934	405,072	96,936
Sept.	139,820	175,630	89,623
Oct.	230,049	337,979	*250,000
10 mos.	3,691,517	4,292,459	1,893,035
Nov.	405,799	376,629	.....
Dec.	518,958	347,349	.....
Year	4,616,274	5,016,437	.....

*Estimated.

Estimated by *Ward's Reports.*

Week ended:	1938	1937†
Oct. 15	50,540	89,680
Oct. 22	68,360	91,905
Oct. 29	73,335	90,155
Nov. 5	80,030	89,770
Nov. 12	86,300	85,325

†Comparable week.

	Week Ended Nov. 12	Nov. 5
General Motors	42,100	38,825
Chrysler	20,350	18,250
Ford	13,450	12,875
All others	10,400	10,080

The Steering Wheel Has Been Removed to Give You a Better View of the Instrument Panel.

SOMETIMES IT'S THE LITTLE THINGS THAT SELL

With the assurance of good performance regardless of cost, many of today's automobiles are sold on the basis of interior details—details often made possible with ZINC Alloy Die Castings.

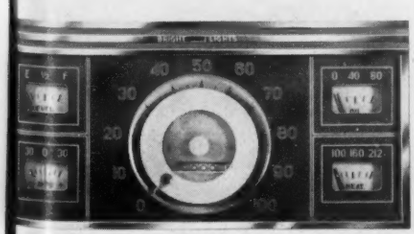
The quiet dignity and trim lines of the above instrument panel are in keeping with the '39 public taste. Finished in grained enamel and nickel plate, the die cast instrument group, radio grille, and glove compartment door present a quality appearance that would be difficult to duplicate by any other production method. Incidentally, the speedometer in the instrument group is an innovation in the automotive field. The speedometer needle changes color at various speeds—from green to amber at 30 m. p. h.—from amber to red at 50 m. p. h. This is a decisive step forward in the current campaign for safe driving.

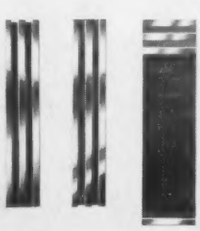
The utility of ZINC Alloy Die Castings for automotive applications is well-established, but when their use is dictated largely by design factors, as in these dash panel parts, one realizes that their full scope has by no means been reached. Whether *your* problems concern automotive parts or any other type of metal parts production, you should be familiar with this versatile metal and method. Consult any commercial die caster, or write to The New Jersey Zinc Company, 160 Front Street, New York City.

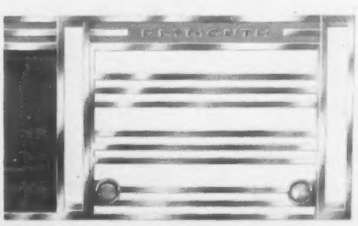
ZINC
ALLOY DIE
CASTINGS

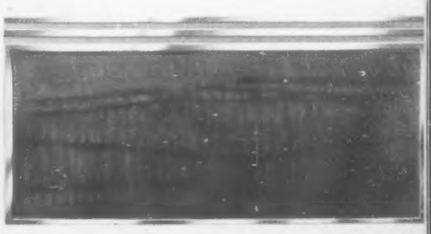
The Research was done, the Alloys were developed, and most Die Castings are specified with

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC









EDITORIAL

Time To Think About Skilled Men

■ IN THE business improvement that followed the depression of 1929 it was not until 1935 that an acute shortage of mechanics became apparent. It was found that thousands of skilled workers who had been thrown out of employment by the depression had been lost to industry permanently. The situation was aggravated by the fact that many companies had been forced to discontinue their apprentice training systems because of lack of work on which to train newcomers to industry.

To meet this condition many companies established facilities for the rapid creation of single-operation machinists. By selecting men who in most cases had some sort of mechanical background, it was found possible in many cases to give them sufficient training over a period of six months to enable them to operate machines competently. Even with such methods it was not until the fall of 1937, after the volume of business had receded from the peak, that the shortage was found to have been relieved.

Providing Trained Workers for Future Shortage Is Wise Policy

A casual survey at the present time reveals that the available supply of mechanics still is larger than the demand. While a great many shops which have benefited from the recent upward surge of business have recalled some of their skilled men who had been laid off, comparatively few have recalled all.

In the meantime STEEL's index of activity in the metalworking industries has climbed back slowly until it now stands at 91.5 per cent as compared with 95.7 per cent a year ago.

Possibly the time is not far off when another shortage of mechanics will be disclosed. Not only the increasing demand for normal products but various facets of the country's defense program that have been held to view make it seem likely that there is going to be more work for mechanics, particularly in the so-called capital goods industries.

It, therefore, is sound policy for the employer of skilled men at this time to review his supply and decide whether he needs to do something to safeguard his business against a future shortage. Some companies already have anticipated the future possibilities by recalling learners who had been laid off months ago, even though they have not recalled all of their laid-off mechanics.

In the past a large share of the burden of training mechanics has been borne by large companies with rounded-out facilities. Of interest, therefore, is a new plan for training skilled workers at small plants. Evolved by the American Gear Manufacturers' association's industrial relations committee, of which Russell C. Ball, president, Philadelphia Gear Works, Philadelphia, is chairman, it is intended to aid small gear shops in developing mechanics. It embodies a course of instruction in machine adaptation and operation whereby young men can be converted into mechanics. To learners completing such a course will be awarded a certificate issued by the association and certified and approved by the operating officials of the company at whose plant they have been trained.

Small Shop Can Use New Plan To Enlarge Supply of Mechanics

The course is one that can be installed at any small shop. It will stretch over 18 months, with a scheduled amount of time in each department of the plant. The objective is to bring to learners a well-rounded experience which will make them useful and adaptable in all phases of shop operations. The course is devoid of the educational features of the apprentice systems of many of the larger companies. While attendance at night-school is encouraged for the more ambitious boys, it is not mandatory. The sole purpose is to produce mechanics.

THE BUSINESS TREND

Activity Index Tops Comparative 1937 Level

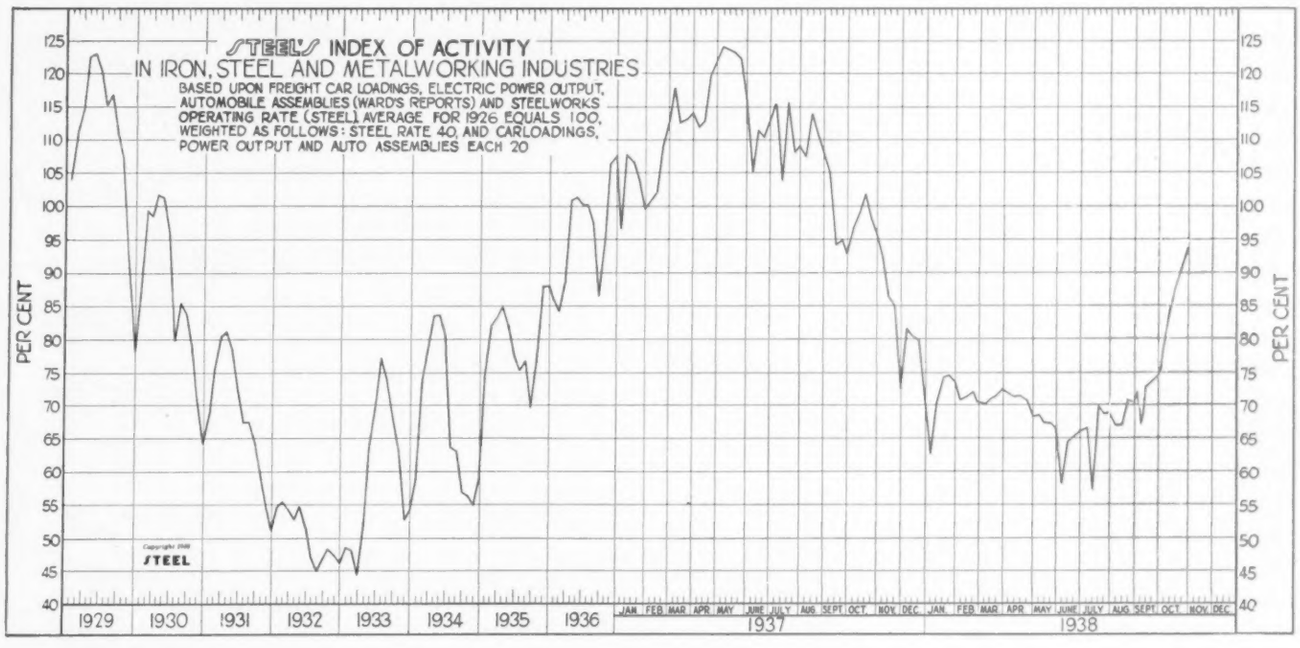
■ BUSINESS has reached the midway point of November without exhibiting signs of a faltering in new demand to the extent of impeding the upward trend of industrial activity. Encouraging business developments continue to dominate the news and to reaffirm the basic character of the economic upturn.

In the week ended Nov. 5, STEEL's index of activity in the iron, steel and metalworking industries stood at 93.4 per cent, an increase of 2 points from the 91.4 per cent of the previous week. This recent increase has advanced the index to the highest level of the year and represents the first time this year that it exceeded the comparable period during 1937.

Contributing heavily to the advance in STEEL's index was the encouraging gain of 3 points in steelmaking operations. The national rate of 57.5 per cent in the week ended Nov. 5 marks another new high for the year and is substantially above the 47 per cent recorded in the same week last year. The brisk advance in steelworks operations the last few weeks reflects in large part the increase in automotive and building activity, while other miscellaneous lines have also contributed their share. The present rate of 57.5 per cent represents an increase of 33.5 points from the low this year of 24 per cent reported in the week ended July 9. Still further gains in this industrial indicator are anticipated in the week ended Nov. 12.

Automobile assemblies in the week ended Nov. 5 continued the steady upward movement noted since the middle of September. Production of 80,030 cars and trucks in the week ended Nov. 5 represents the highest weekly output this year but still remains below the comparative 1937 level. The indications are that the trend will continue upward in the week ended Nov. 12 for the eighth consecutive weekly period. Early estimates of motor car assemblies for November approximate 365,000 units, compared with the estimate of 240,000 for October and with 376,629 vehicles produced in November, 1937.

Revenue freight car loadings declined more than sea-



STEEL'S index of activity gained 2 points to 93.4 per cent in the week ended Nov. 5:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
July 30	69.0	109.1	102.5	78.4	66.4	78.8	46.1	68.9	79.2	117..
Aug. 6	66.9	107.3	98.7	73.4	64.6	75.9	45.1	67.0	85.6	117.2
Aug. 13	66.9	113.8	92.6	77.5	64.6	74.7	44.6	67.4	86.2	116.8
Aug. 20	70.5	110.3	97.7	77.0	61.4	74.2	44.9	67.3	88.5	116.4
Aug. 27	70.3	108.5	94.0	77.3	60.3	71.6	45.2	66.5	87.4	116.9
Sept. 3	72.3	104.8	87.5	70.9	55.1	70.3	45.4	65.3	79.0	106.3
Sept. 10	66.8	94.3	83.1	70.1	53.5	65.5	44.9	60.9	85.9	114.0
Sept. 17	72.9	95.0	90.1	69.4	58.7	69.1	47.8	65.6	86.2	112.2
Sept. 24	74.0	93.0	86.2	68.5	58.1	68.2	48.0	65.2	83.8	110.7
Oct. 1	74.9	96.6	89.0	73.3	59.3	66.9	47.7	62.4	81.0	109.1
Oct. 8	78.9	99.0	93.4	74.9	54.7	67.4	48.4	61.5	79.4	108.2
Oct. 15	84.3	101.8	95.5	77.4	56.4	66.0	48.7	57.9	77.5	106.1
Oct. 22	88.7	97.5	97.1	82.4	58.2	60.9	48.7	58.2	77.4	104.8
Oct. 29	91.4†	95.7	99.1	86.4	56.3	58.0	48.3	55.9	72.5	102.5
Nov. 5	93.4*	92.3	102.1	88.4	55.0	52.3	48.5	56.0	71.5	98.1

* Preliminary. † Revised.

sonally in the week ended Nov. 5 to approximately 672,689 cars. This represents a decline of 53,923 cars from the peak this year recorded in the week ended Oct. 15, although it remains substantially above the low point of 501,013 cars loaded in the week ended July 9. Abnormal warm weather has played an important part in the more than seasonal decline of this business indicator. Despite the moderate decline in electric power consumption during the week ended Nov. 5 to 2,207,444,000 kilowatt-hours, it exceeded the comparable week in 1937 for the first time this year.

NOVEMBER FREIGHT CAR AWARDS INCREASE

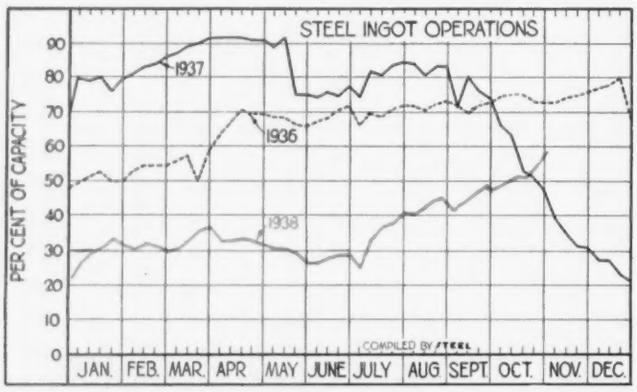
Domestic freight car awards in October totaled 2537 cars, exceeded only by May of this year when awards aggregated 6014 cars. October awards compared with 1750 in September and 182 in August. In October last year car awards totaled 1355. During the first ten months awards totaled 12,520, compared with 51,061 in the corresponding period last year; 39,523 in the same period during 1936 and 9158 in the first ten months of 1935.

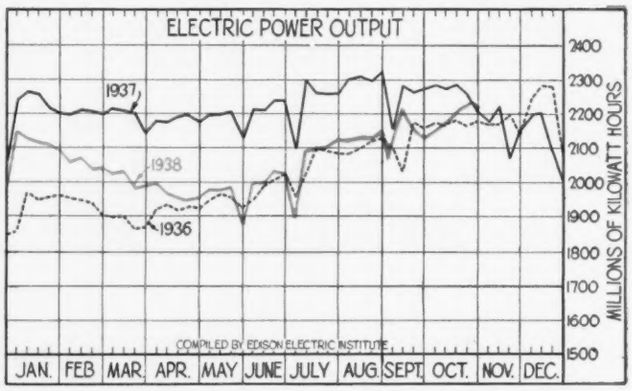
INDUSTRIAL PRODCTION IMPROVES

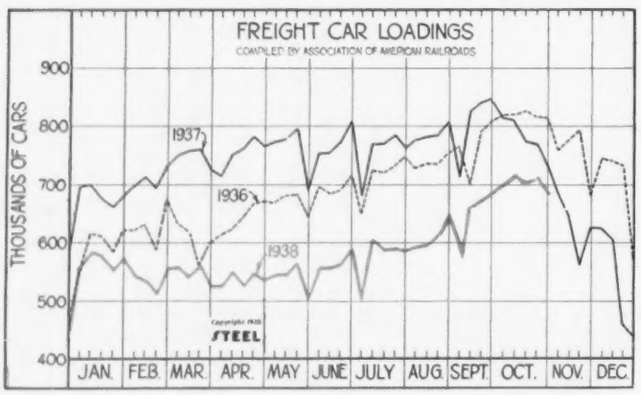
Volume of industrial production showed the fourth consecutive monthly increase during September, according to the Federal Reserve board's seasonally adjusted index. An increase during September of 2 points to 90 per cent of the 1923-1925 average forced the index into new high levels for this year. However, it still remains substantially below the 111 per cent reported in the same month last year. Reflecting the increased industrial activity during September, factory employment and payrolls increased further and distribution of commodities to consumers showed a more than seasonal rise. Additional improvement in industrial production is predicted for October.

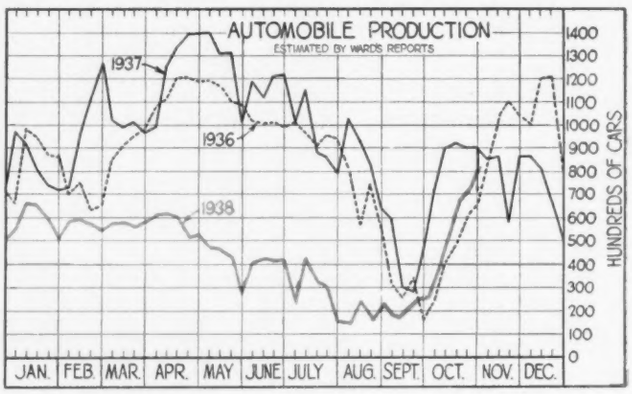
PIG IRON OUTPUT UP 18.9 PER CENT

Average daily coke pig iron output in the United States in October amounted to 66,694 gross tons, a gain of 10,591 tons over the September rate of 56,103 tons. This was the highest daily output since November, 1937, with 66,901 tons. October daily average production last year was 93,259 tons. Relating production to capacity, operations in October averaged 48.0 per cent against 68.4 per cent in October, 1937. Seventeen blast furnaces were added to the active list during October, bringing the total to 114, highest in 11 months. This was the largest number of furnaces to return to operation in one month since April, 1936, when an equal number became active.



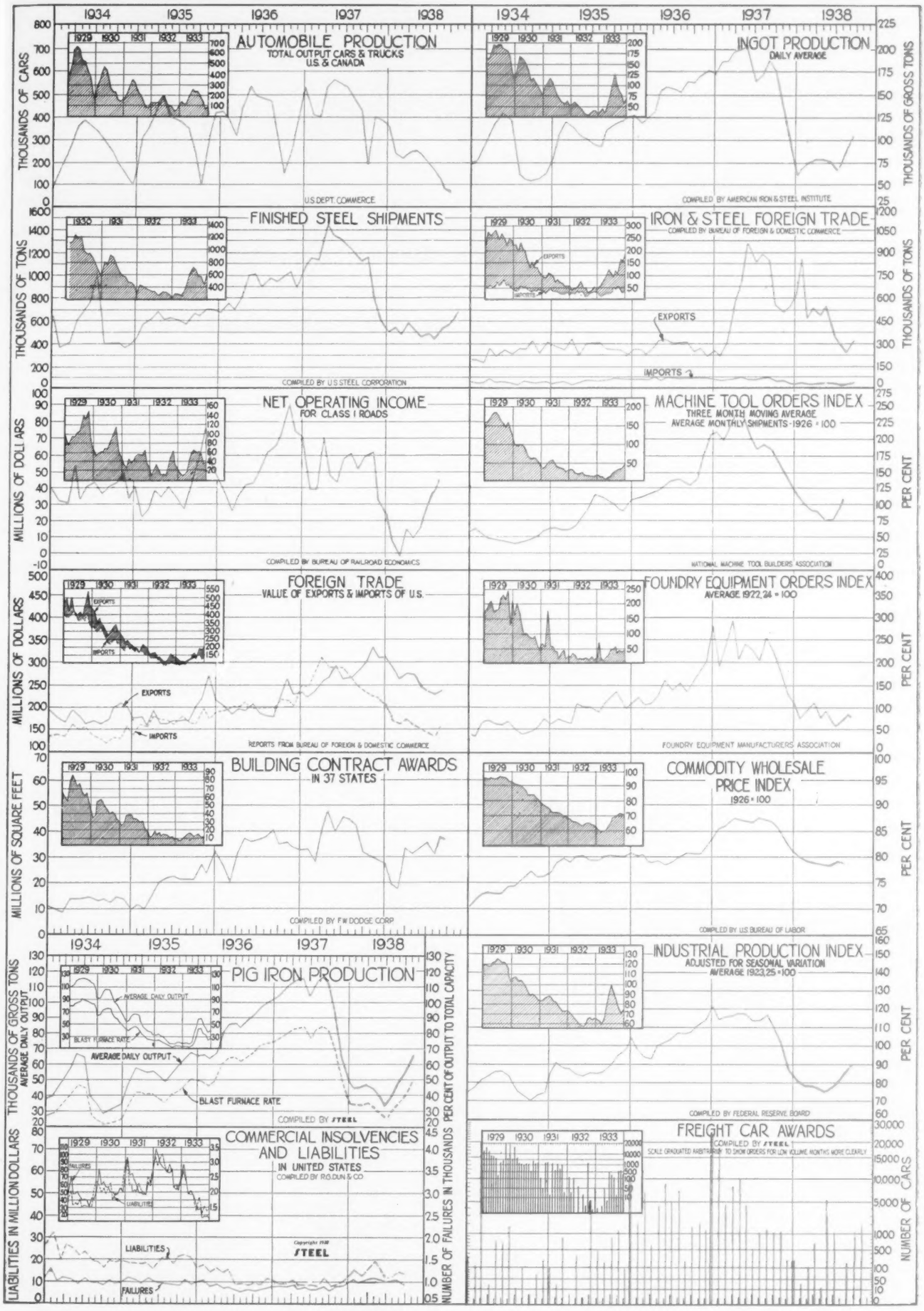






Week ending	Steelworks Operating Rate Per Cent 1938	1937	1936	Electric Power Output Million KWH 1938	1937	1936	Freight Car Loadings 1938	1937	1936	Weekly Auto Output 1938	1937	1936
July 30	37.0	84.0	71.5	2,093	2,256	2,079	588,703	782,660	747,551	30,390	86,448	95,970
Aug. 6	40.0	84.5	71.5	2,115	2,261	2,079	584,050	769,706	728,293	14,771	78,736	81,804
Aug. 13	40.0	84.0	70.5	2,133	2,300	2,093	589,561	777,382	736,497	13,790	103,250	56,679
Aug. 20	41.5	81.0	72.0	2,138	2,304	2,125	597,918	781,247	734,973	23,940	93,339	73,709
Aug. 27	43.5	83.0	73.0	2,134	2,294	2,135	620,511	787,373	753,742	18,700	83,310	53,937
Sept. 3	44.5	83.0	71.5	2,148	2,320	2,098	648,039	804,633	764,680	22,165	64,200	31,628
Sept. 10	41.5	72.0	69.5	2,048	2,154	2,028	568,887	711,299	699,859	17,485	59,017	26,750
Sept. 17	46.0	80.0	72.5	2,214	2,280	2,170	660,142	826,565	789,510	16,100	30,150	33,165
Sept. 24	48.0	76.0	73.0	2,154	2,265	2,157	675,553	840,446	807,070	20,390	28,030	15,680
Oct. 1	47.0	74.0	74.5	2,139	2,275	2,169	697,938	847,245	819,126	25,405	45,830	22,800
Oct. 8	48.5	66.0	75.0	2,154	2,280	2,168	702,964	815,122	820,195	37,665	71,958	39,945
Oct. 15	51.5	63.0	75.0	2,182	2,276	2,170	726,612	809,944	826,155	50,540	89,680	48,195
Oct. 22	51.5	53.0	73.0	2,214	2,281	2,166	705,628	773,353	815,972	68,360	91,905	59,740
Oct. 29	54.5	51.0	73.0	2,226	2,254	2,175	708,840†	771,655	814,175	73,335	90,155	66,985
Nov. 5	57.5	47.0	78.0	2,207	2,202	2,169	672,689*	732,145	759,318	80,030	89,770	84,305

*Preliminary. †Revised.

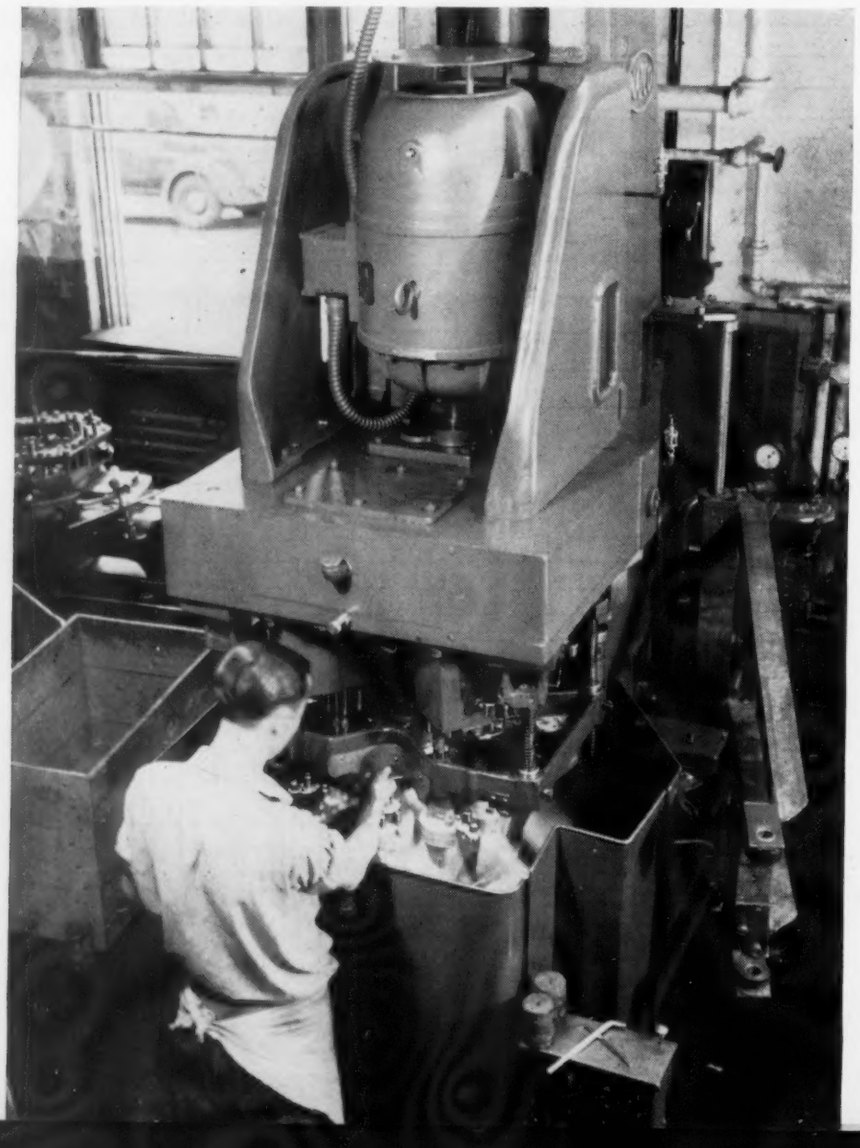

AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
Copyright 1938 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF TONS
MILLIONS OF DOLLARS
MILLIONS OF SQUARE FEET
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
PER CENT OF OUTPUT TO TOTAL CAPACITY
THOUSANDS OF GROSS TONS
PER CENT
NUMBER OF CARS

Food Machine Production

To check movement of parts, 20,000 cards detailing 160,000 time studies form part of elaborate control system. Special equipment affords economies in the machine shop

■ CO-ORDINATED manufacturing operations in the Troy plants of Hobart Mfg. Co. produce a Hobart food machine every two minutes. Since about $1,350,000 worth of parts and machines are in process at all times in these plants, materials handling has received much study.

The Hobart Troy plants include a gray iron foundry, a nonferrous foundry, a power plant and a separate dishwasher plant in addition to the main plant in which stamping, machining, heat treating and finishing operations are carried on in conjunction with the manufacture of Hobart food mixers, coffee mills, slicers, food cutters, peelers, meat choppers and Kitchen Aid food preparers. The main plant also includes a motor division where motors are made especially for Hobart machines.



Due to the various products requiring different manufacturing operations, no one path of movement through the plant for equipment in process has been possible. However, production is handled in lots of several hundred units per order which follow a carefully worked out plan of movement through the plant.

The production planning and control department is responsible for keeping each line of material moving systematically from raw stock to finished product. Much detail must be properly handled as there may be between 250 to 300 parts for one type of machine, all of which must reach the final assembly at a given time.

Cards Control Movement

To keep all materials moving on schedule, operation cards carrying full directions for each part are maintained. Groups of cards are assigned to cover one part and its sequence of operations. At the present time more than 20,000 such cards are in use. Since for every operation there is a tool and in many cases a pattern, accompanying tool and pattern stocks are handled on a similar carefully worked out plan.

Each of the operation cards used in the production planning and control department has a time study card which carries a study of each operation covered by these cards. Averaging eight operations to a

Fig. 1—Special machine drills 354 holes in one piece of work, indexing six times and drilling 59 holes at each operation

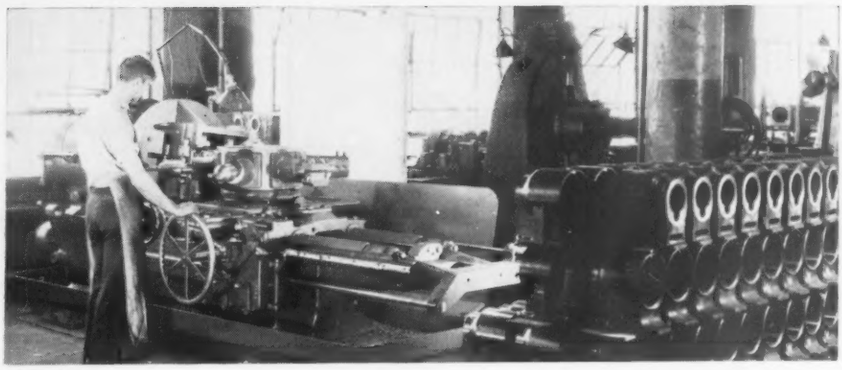


Fig. 2—This heavy duty turret lathe produced a 300 per cent increase in production in the milling and drilling departments

card, there are over 160,000 individual time studies on file.

The tool crib affords storage for approximately 20,000 different tools and jigs. All special jigs, fixtures, drills, taps, dies and gages are located here and are listed in a detailed index which facilitates locating them at a moment's notice. An individual card specifies the exact tool for each operation.

After the best possible method of machining a part has been worked out, a record with a detailed drawing of the particular setup is made for duplication at any future time. Time study men help machine operators to obtain the full benefit of all latest improvements in machine tools and equipment.

Wherever feasible special machines have been installed to facilitate operation. One of these is shown in Fig. 1. This machine drills 354 holes in a ⅛-inch meat chopper plate, 4 inches in diameter. This machine has six stations which index through the drilling cycle. Operator removes completed plate and inserts new one to be drilled each time the machine indexes.

Index is under automatic electric control which causes machine to cease operation if the attendant is late in performing his operation or fails to push a supervisory button giving the machine the right-of-way. At each station, 59 holes are drilled simultaneously. Each set of drills operates in a different position so after indexing under the six heads, the plate is completely drilled. Drill feed is automatic. One plate is completely drilled every two minutes.

Fig. 2 shows one of two 36-inch heavy duty turret lathes recently installed to handle machining operations on housings for meat grinders. A stock of these housings may be seen at the right in Fig. 2. The heavy duty turret lathe employs a 6-head index tool setup and has been found a valuable means of increasing production on these operations. Formerly this work was handled on large boring mills.

Each of these two turret lathes utilizes a 1500-pound fixture which revolves at 211 revolutions per minute and maintains an accuracy of 0.0005-inch. These machines have made a 300 per cent increase in production in the milling and drilling departments.

Work is handled through the machining department on trucks, several types of which are used here and in the other departments including the motor manufacturing division. Hobart builds more than 1250 different specifications of electric motors. Each type and size of food machine is furnished with a motor specially designed for the service conditions encountered.

Uses Progressive Dies

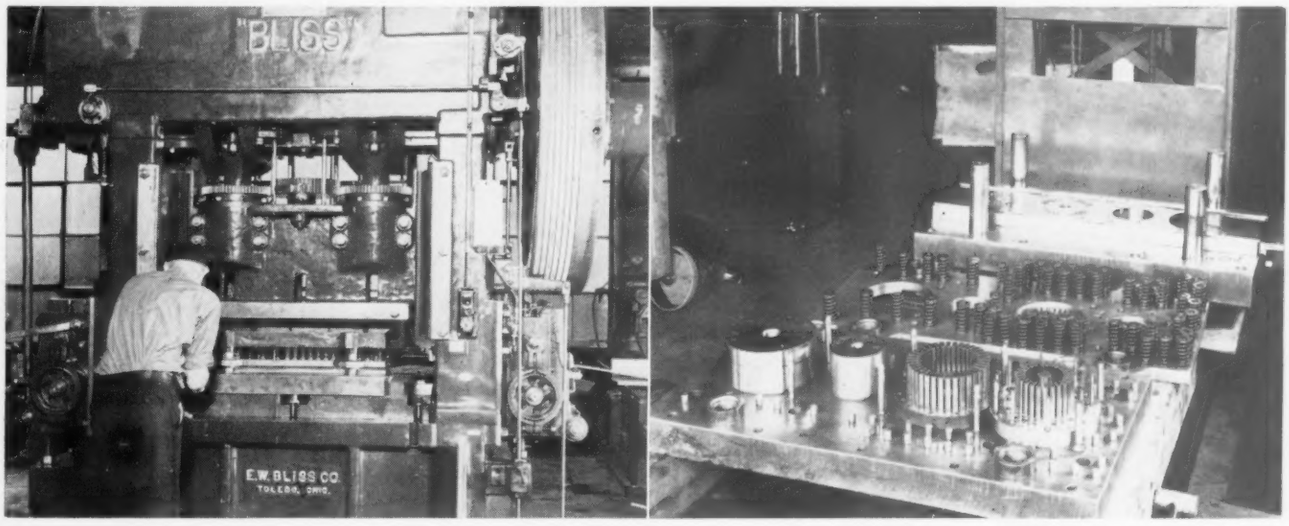
Fig. 3 shows a new press recently installed in the stamping department. It employs a progressive die to stamp out rotor and stator laminations for motors. Strip steel fed into the press is automatically indexed through four stations and comes out in the form of complete rotor and stator laminations. A set of progressive stamping dies for this press is shown in Fig. 4. This set of dies weighs nearly two tons and cost $4000. Since laminations can be produced in a continuous operation at a high rate of speed, use of these progressive dies makes possible a total production equivalent to that of several ordinary types of presses.

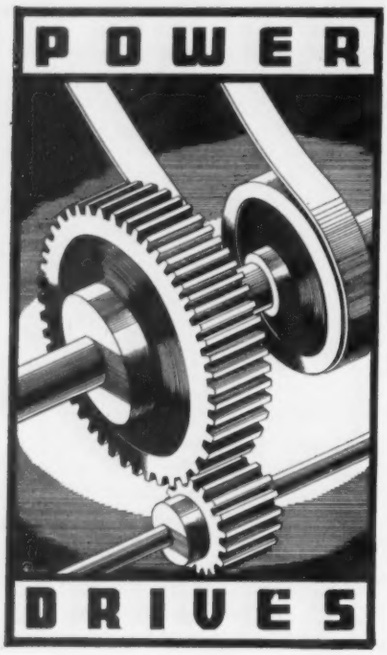
As may be seen from examining dies in Fig. 4, progressive operations involved include punching rotor slots on a small inside radius in the first stage, punching stator outside of these on a larger radius at the second stage, blanking out rotor disk at the third stage and blanking out stator disk at the fourth stage. The index feed is seen at the right in Fig. 3 pulling strip from a pile.

(*Please turn to Page* 83)

Fig. 3—Press uses progressive dies and automatic feed. Strip enters at right and skeleton passes out at left with punchings and completed laminations falling through the press

Fig. 4—Progressive dies slot rotor lamination, slot stator section, blank out rotor and then stator in four successive operations. Dies and stripper plate are shown here





Power

New 98-inch strip mill shows modern trends in electric circuits for power drives. Main drives at 11,000 volts; auxiliaries employ 440 volts with transformers to furnish 220 volts for control circuits

■ POSSIBLY the most important factor in the successful operation of the huge power drives at Republic's new 98-inch strip mill is the assurance of a steady, uninterrupted flow of electric power to the mill stand motors. No small part of this depends in turn upon adequate wiring, transformers and primary service lines. Description of important features of the power circuits in this mill, essential wiring and control services will be presented here.

In planning location of power circuits in any plant, the first consideration is location of the distributing center for incoming power. It is essential that the distribution center coincide roughly with the plant load center if most economical distribution and lowest losses are to be obtained. At this mill, the largest concentration of power is in the motor room serving the hot mill. Reference to the accompanying layout of the plant, Fig. 1, will show that this room is near the southeast corner of the mill building. Thus this is a logical location for the primary transformers and incoming lines.

Power for the mill comes in from Harvard avenue, a few hundred yards south of the plant. Electrical power is taken from the Cleveland Electric Illuminating Co.'s substation, about 2 miles east of the plant. Here power is reduced from 132,000 to 11,000 volts, 3 phase, 60 cycles, which is furnished to the mill. Six cables, each containing three conductors of 600,000 circular mills, are run underground from Harvard avenue into the high voltage switching equipment located in the basement below the motor room in the hot mill.

This line has total capacity of 48,000 kilovolt amperes necessitated by actual swinging loads up to 40,000 kilovolt amperes which are produced when roughing mill, hot mill and cold mill peaks occur simultaneously. Actual 30-minute demand averages between 15,000 and 16,000 kilovolt amperes at present.

The incoming cables terminate in steel-clad cubicles in the basement

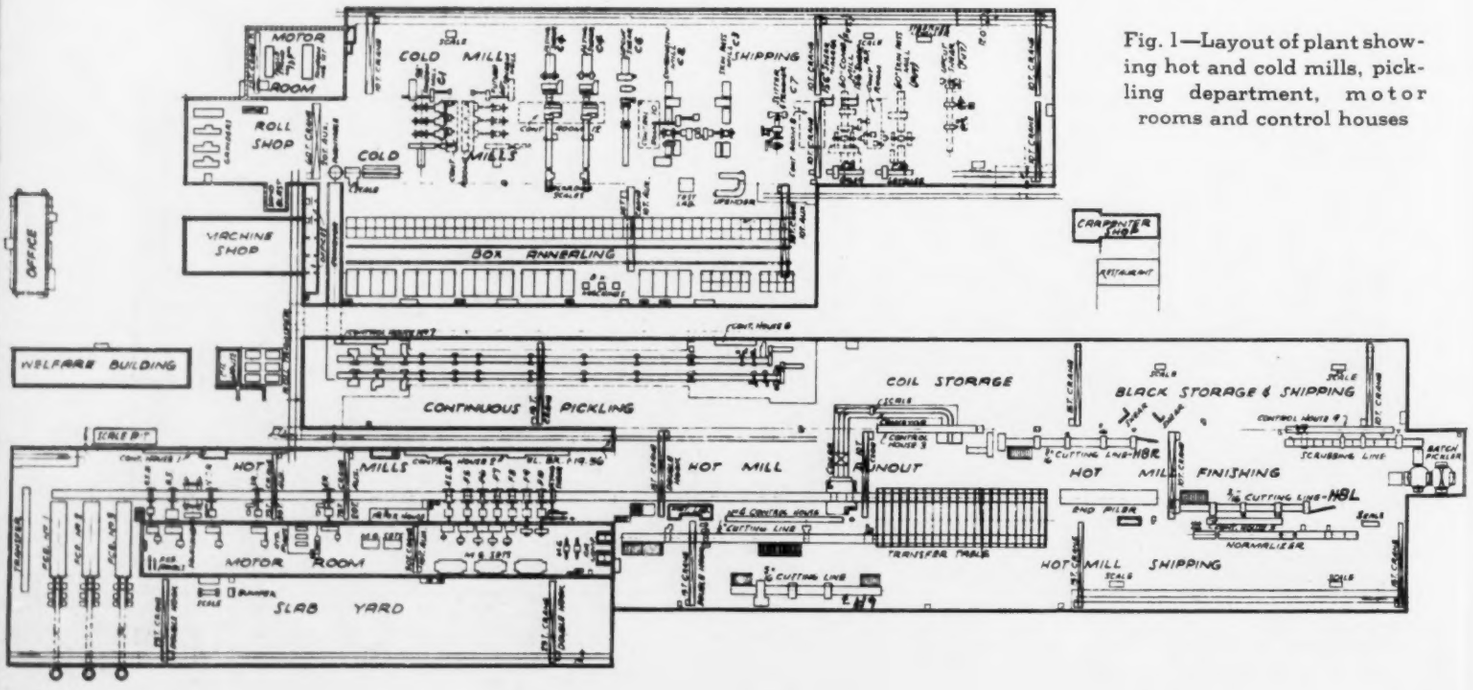


Fig. 1—Layout of plant showing hot and cold mills, pickling department, motor rooms and control houses

Circuit

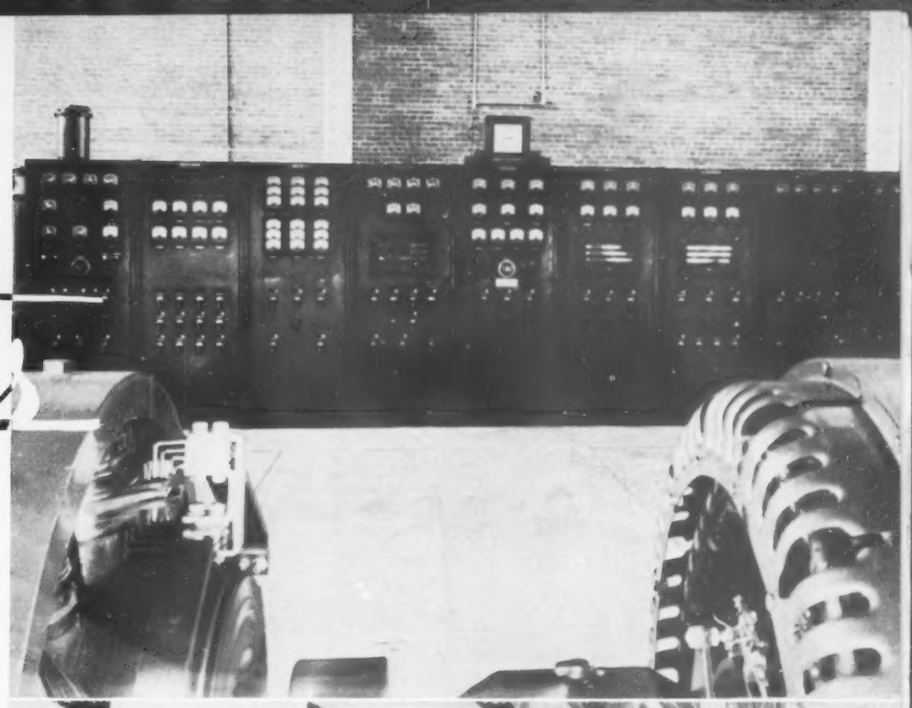
below the motor room floor, disconnecting switches and metering transformers being accessible only through interlocked doors. Use of Pyranol in transformers makes it possible to locate them in the same room with other equipment, due to the non-hazardous nature of this type of transformer insulating dielectric. Consequently 11,000-volt transformers are located in the motor room. This permits very compact arrangement of the high voltage equipment and eliminates necessity of the separate substations usually required.

Power company's metering equipment is located in the basement adjoining the steel enclosed 11,000-volt switch gear. Fig. 6 shows the high-voltage control equipment used for high-voltage drives. The following equipment all employs 11,000-volt-service; the three 6000-kilowatt, 600-volt, motor generator sets which supply variable voltage, direct current to the hot-mill finishing stands; the two 1500-kilowatt, 250-volt, motor generator sets furnishing direct current for auxiliaries, etc. Also a 11,000-volt line runs from here to the cold-mill motor room, located in the southwest section of the plant. These furnish variable voltage, direct current to the cold mill drives.

A 12,000-kilovolt ampere transformer bank is utilized to reduce the 11,000 incoming line voltage to 2300 volts which is fed directly to the four, 3000-horsepower, roughing mill motors and an 800-horsepower, roughing scale breaker motor.

This transformer bank also furnishes 2300-volt service to two 400-

(*Please turn to Page* 54)



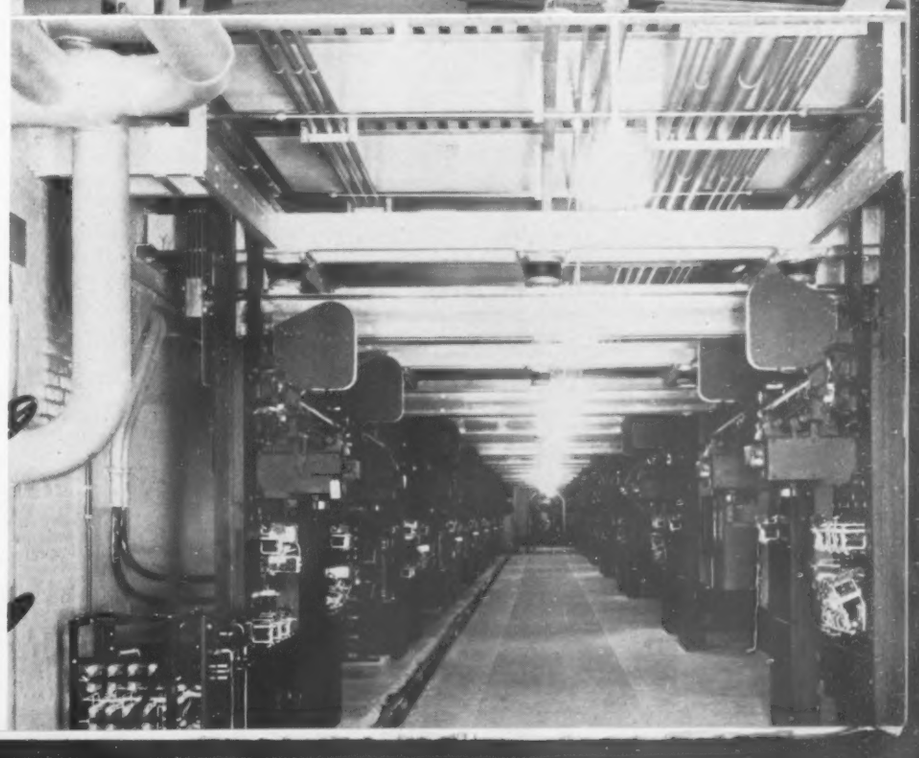


Fig. 2 (Top)—Duplex board in hot-mill motor room. Hot mill motors and equipment are started up here and switched to control pulpit in Fig. 7 overlooking stands. Fig. 3 (Center)—Control house opposite hot-mill runout table. Fig. 4. (Lower)—Aisle below hot-mill motor room with 600-volt generator breaker panels on right and motor panels on left

Stressed-Skin Cars

Welding plays important part in unique new railroad car which exhibits excellent riding characteristics and which has weight of only 1125 pounds per passenger

By E. F. STONER
Structural Engineer
C. T. Hill
Inglewood, Cal.

■ A NEW type of railway passenger car design has recently aroused considerable interest due to unusual structure features and riding qualities. This involves a radical departure from standard end-truck and suspension structures said to answer two of the outstanding problems before the railroads today; that is, reduction in weight and increase in comfort at higher speeds.

A consideration of the fact that standard railroad passenger cars accommodating 60 passengers weigh 2000 pounds per passengers whereas highway buses carrying 24 passengers weigh only 750 pounds per passenger, emphasizes the importance of reducing railroad car weights.

Seeking an answer to this as well as the requirements of increased riding comfort, faster schedules and more pleasing appearance, design of a car body truck and suspension system was undertaken. Result is production of the unique cars diagramed in accompanying illustrations. Fig. 1 reveals a cutaway view of a portion of the car body in which the rear truck and suspension structure is housed. Details of the end truck and suspension structure may be seen. The articulated truck and suspension structure in Fig. 4 is used where cars join each other.

The sectional diagram, Fig. 2, compares action of standard trucks with the new Hill car trucks when rounding a curve to the right and reveals how the new suspension permits the car body to bank itself automatically.

An important feature of the design is the provision for lateral springing which is extremely important at high speed operation. Since the truck is effectively grooved to rails which frequently have as many lateral irregularities as vertical, this insulating the body against lateral irregularities does much to increase riding comfort at high speeds.

Utilizes Welded Plate

This truck system utilizes an all-welded, high strength, steel plate, arc welded and stress-relieved construction, permitting the highest possible strength with minimum weight. Wheels are roll forged in a single piece of alloy steel and machined all over. Axles are all heat-treated high-carbon steel, hollow

Abstract from "Welded Stressed Skin Pendulum Type Railway Passenger Car", in *The Welding Journal*, published by American Welding society, New York.

Fig. 1—Cutaway section of body showing rear truck and suspension details

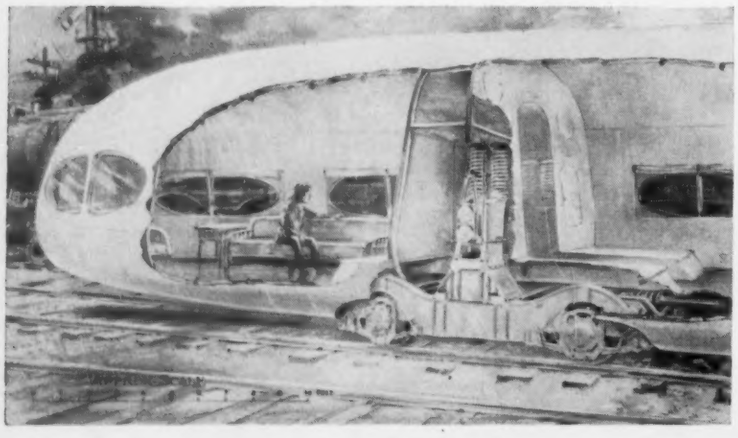
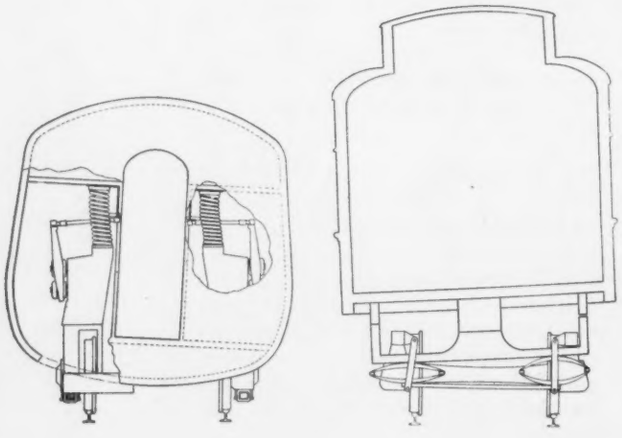


Fig. 2—Sectional diagram of new Hill car and standard car trucks showing action when rounding a curve to the right



YOLOY CARRIES 180 GALLONS FREE ON EVERY TRIP . . .

Every time one of these big Texaco tank trucks takes the road it carries 180 gallons without haulage costs, because it's made of Yoloy -- Youngstown's High Tensile Steel.

If the builders (Pennsylvania Furnace and Iron Co.) had constructed this tank truck over the previous specifications the weight would have been 4,400 pounds. Through the use of Yoloy High Tensile Steel the dead weight was reduced 1,100 pounds. This net saving equals 180 gallons extra dividend on each load.

Yoloy has the following characteristics:

1 - IDEAL WELDING PROPERTIES
2 - HIGH CORROSION RESISTANCE
3 - GREATER STRENGTH
4 - GOOD FORMABILITY
5 - DECREASE IN DEAD WEIGHT

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
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High Tensile Steel Yoloy is available in sheets, strips, plates, bars, shapes, manufacturer's wire, welding wire, seamless pipe and electric weld pipe. 3-6A

YOUNGSTOWN

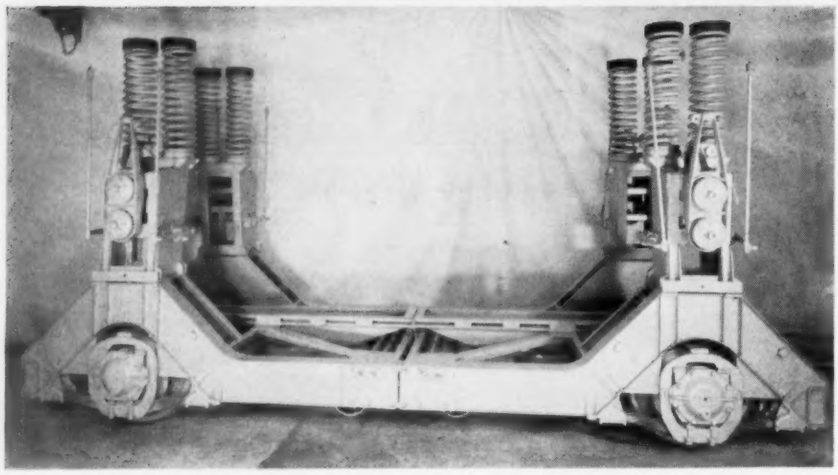


Fig. 4—Articulate truck and suspension structure

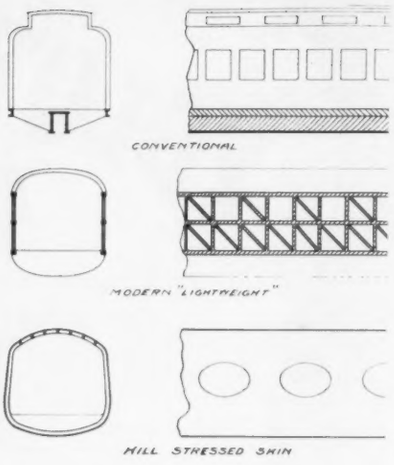


Fig. 3—Typical methods of car construction showing principal load carrying structure

bored and machined all over. Ball bearing journals are employed.

To permit light-weight body structure, a radical departure from conventional practice also was employed. Experience of modern aircraft manufactures in developing structures of high strength-weight ratios has been used in designing the stressed-skin body structures of these new cars. Characteristic feature of this type of structure is that the outer covering and skin is used as a principal load carrying element suitably stiffened and supported. By proper design the skin is able to carry its load without the usual buckles or "load wrinkles."

This method of construction saves considerable weight by eliminating much frame and truss work of conventional body structures, allowing the outer covering to do the work. This is diagramatically illustrated in Fig. 3 which compares principal load carrying structures of two types of standard cars with that of the stressed-skin car. The older design consisted primarily of a heavy center sill below the floor forming the backbone of the car and supporting the weight of all the rest of the structure. A step forward was the sidewall truss type of construction, the middle design illustrated in Fig. 3. Here the side walls are built as deep trusses largely supplanting the center sill.

Stressed-skin cars are still another step forward. Here the center sill serves only to carry end loads and complicated side trusses have been eliminated completely, the outside covering being especially designed and reinforced to carry all the primary loads.

Normally the stressed-skin body acts as a huge tubular beam, the roof being the compression flange, the floor the tension flange and the two sides the shear webs.

Theoretically if the skin were heavy enough to behave itself, it would be all the structure necessary. However, the deep beam is so effective that only a 16-gage sheet is needed for the skin, hence it must be supported adequately by transverse ribs to maintain the shape of the body. On the compression side (roof), it must be reinforced

Fig. 5—Structure for steel "stressed skin" railroad car body

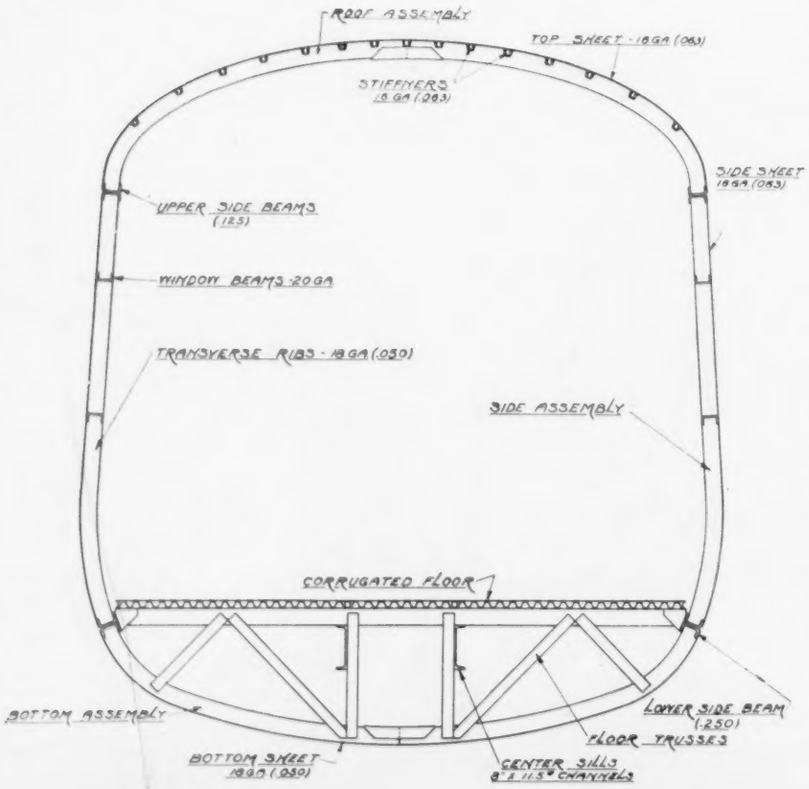
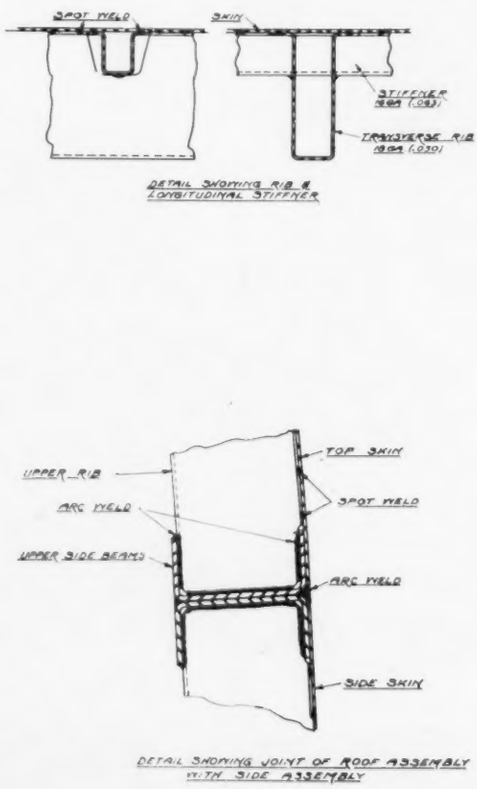


Fig. 6—Typical details of body construction



with longitudinal stiffeners to assist in carrying compression loads.

Design of this coach is built around the use of welding to assemble the various members. Typical details of body construction where welding is employed are shown in Figs. 5 and 6. Principal body structure consists of four subassemblies; the roof structure, two side channels and bottom or floor structure. Roof is constructed of two side channels formed from 0.125-inch sheet running the length of the car, 18-gage transverse ribs notched to receive 16-gage hat section, continuous longitudinal stiffeners and a 16-gage cover sheet.

Side channels are of similar construction. Bottom assembly consists of two longitudinal side channels formed from ¼-inch plate, rib segments, floor truss built up of 16 and 18-gage sections and the center sill. Floor trusses transfer service loads to the ribs and then to the side sheets. All these details may be seen in Fig. 5.

Spotweld Automatically

Car is designed for spot welding longitudinal stiffeners to the upper skin as shown in upper section of Fig. 6. As seams are straight and continue entire length of car, automatic spot welding will probably be used. Similarly the skin may be attached to transverse ribs by continuous seams of spot welding.

The final assembly will be made by bringing the four completed subassemblies together and joining them by arc welding the channels together as indicated in lower section of Fig. 6. This involves four continuous fillet welds on the outside and four seams on the inside. These welds not only join the subassemblies but tie the cover sheets together to transmit horizontal shear loads and form a perfectly smooth outer surface. These welds also act to splice the rib segments together and to transmit transverse bending loads from one rib segment to the other. Since these welds also are straight and continuous for the entire length of car, automatic welding equipment is to be used. It is expected a positioning jig will be employed to permit locating the body about a longitudinal axis thus permitting all welds to be made in a horizontal position.

Since the parts are all relatively light gage and are designed for the most effective use of spot and arc welding, the welding operations are highly efficient. Sinch each sub-assembly is a complete unit, final assembly is simple.

Number of component parts is reduced to a minimum and effective design makes every part carry its share of the load, permitting use of light sections because each part is relatively lightly loaded and there are no points of high load concentration. The problem of joining such parts is not difficult.

It is estimated that an 80-foot car will require 9000 linear feet of spot and arc welding. Of this, 7000 feet is continuous straight line spot welding and 700 feet continuous straight line arc welding with about 600 feet of miscellaneous spot welding and 700 feet of arc welding, principally tacking and short welds.

Majority of spot welding involves 16 and 18-gage sheets while arc welding involves these as well as ⅛ and ¼-inch material. While this particular car body structure is still on the designing table there is little doubt that actual construction will be very similar to the outline given above. Already experimental bodies built of Douglas Fir plywood, ⅜-inch thick, for the outer covering have shown the excellent rigidity and riding characteristics produced by this design.

Comparison of weights gives a figure of 57,000 pounds car weight for a 65 passenger day coach with additional 16,000 pounds for passengers and baggage. Total weight of the car loaded is 73,000 pounds which is 1125 pounds per passenger, a very significant figure compared to the 2000 pounds per passenger of standard railroad passenger cars.

Research Seen Nearing Many Startling Advances

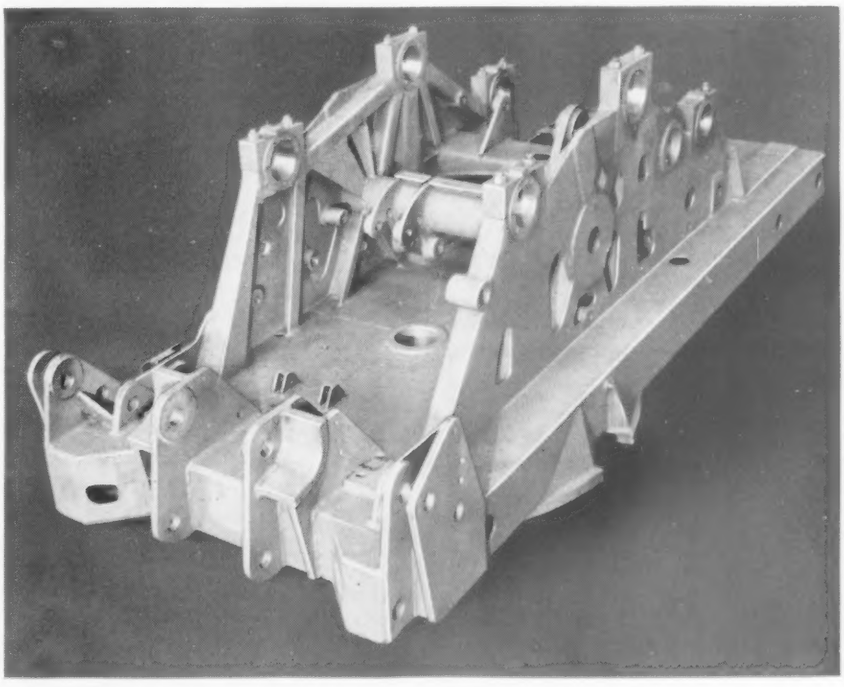
■ In a recent talk before the American Society for Testing Materials, Dr. L. W. Chubb, director, Westinghouse Research Laboratories, East Pittsburgh, Pa., pointed out practical results which can be foreseen from present research.

Possibly the greatest contribution in sight is the generation of electric power directly from combustion of fuel without the intermediate conversion to mechanical power.

Mass spectroscopy is expedited to aid greatly in clearing up difficulties in electronic devices, in chemical analysis and in tracing new combinations of atomic particles. A valuable use for this also is seen in tracing down oil deposits.

Increased strength of metals may be a result of present laboratory work also, said Dr. Chubb, Many mechanical properties of metals are sensitive to heat treatment, flaws and impurities. Theoretically, the atomic force in steel indicates it should have about ten times the strength it exhibits. It is reasonable to expect theoretical exploration will enable us to realize enormous improvements in metals of the future, he added.

Welds Heavy-Duty Excavator Frame



■ **Harnischfeger Corp., Milwaukee, eliminates all bolted connections between frame members carrying heavy stresses by entirely welding the alloy steel frame of the 2½-yard unit shown here. This prevents loosening up of joints and shifting of one member with reference to another. All fitting surfaces are machined at one setting, securing perfect alignment. Reduced cost and weight also are obtained**

Power Circuits

(*Continued from Page* 47)

horsepower synchronous motors driving air compressors, three 1250-horsepower spray pump motors, three 400-horsepower general service pump motors and two 1250-horsepower motors driving motor-generator sets for the hot-mill runout table. This runout table employs 159 mill type, direct current, totally enclosed, shunt wound, ball bearing motors, each of 4.5 horsepower.

Use of Ward-Leonard control system eliminates conversion losses formerly experienced with variable frequency motor generator sets and alternating current motors for hot mill, runout table service. Both runout and coiler motors are served by these 1250 horsepower, motor generator sets. Beyond the coilers the hot mill runout table continues with 119 more individual motors. These runout table motors are divided into groups of 60 or more with a separate generator furnishing variable-voltage power for each group. Runout tables can be started from a dead stop, accelerated to maximum speed of 2350 feet per minute and stopped again in 13 seconds with this equipment.

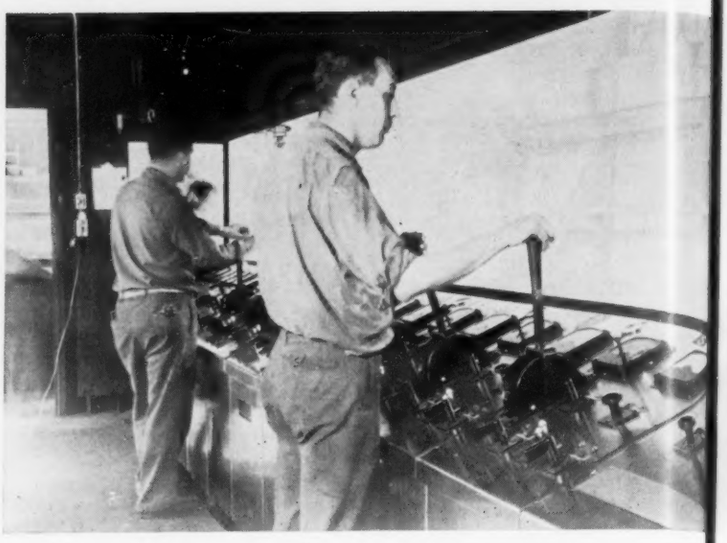


Fig. 7—Control pulpit overlooking finishing stands of hot mill

Reduce Line Voltage

Another bank of transformers reduces the 11,000 incoming line voltage to 440 volts for auxiliary motors and the lighting load. This bank is rated 3000 kilovolt amperes. The plant lighting load, amounting to about 900 kilowatts, is supplied by a number of 37½ and 50-kilovolt-ampere transformers reducing the 440 volts to 110 and 220 volts at various locations throughout the plant.

Starting at the beginning of the hot mill line, a description of individual drives includes 800 horsepower, 2300 volt, alternating current, 360 revolutions per minute motor driving the roughing scale breaker. Broadside mill, the next unit, is driven by a similar motor of 3000 horsepower, operating at 514 revolutions per minute. The slab squeezer which follows the broadside mill is driven by a 500 revolution per minute, direct current motor. Gear reduction ratio on this drive is 100 to 1.

Roughing stands Nos. 2, 3 and 4 are each driven by a motor which is a duplicate of that used on the broadside mill. The first two roughing stands have double reduction drives with fly wheels mounted on motor pinion shafts. Third roughing stand has a single reduction drive and no fly wheel.

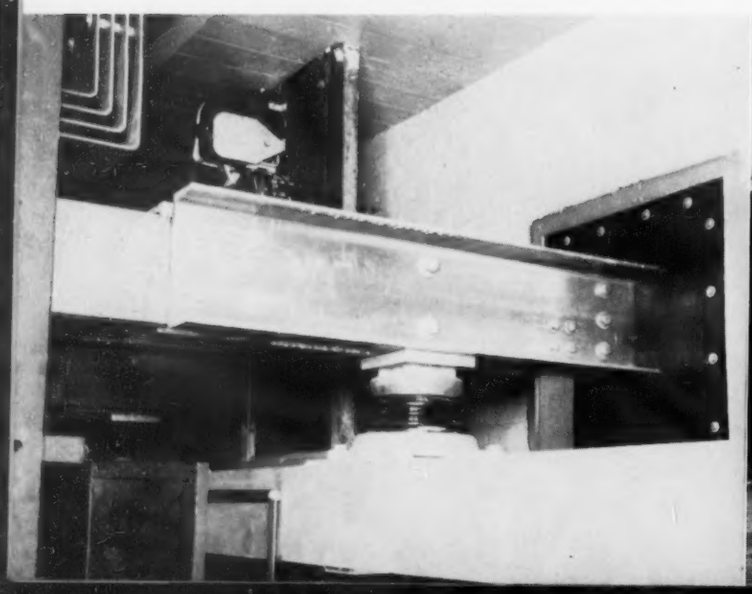
These three roughing-mill drives are controlled automatically to smooth out the steep loads on the 3000 horsepower, wound rotor, induction motors using a slip regulator.

Finishing scale breaker, next unit in the line, is driven by a 600 horsepower, 600 volt, 150 to 600 revolutions per minute, direct current motor. Power for the motor is taken from the 600-volt bus from which the finishing stand motors also receive power.

First five finishing stands are each driven by 4500 horsepower, 600-volt motors at speeds varying from 125 to 250 revolutions per minute except on the fifth finishing stand which may operate as high as 264 revolutions per minute. Last finish stand is driven by 3500-horsepower motor at 150 to 300 revolutions per minute. All these finishing stand motors are connected to the 600 volt, direct current bus system which will be described.

Power for the 600-volt bus serving the hot mill finishing stands is obtained from three motor-generator sets, each driven by an 11,000-volt synchronous motor. Each of these synchronous motors drives two, 3000 kilowatt, 600 volt, direct current generators shown in the wiring diagram, Fig. 11. As will be seen from this diagram, the main 600-volt bus extends parallel between the line of finishing-mill motors and the line of motor-generator sets. This bus and disconnecting circuit breakers, mounted in an aisleway below the motor room are shown in Fig. 4. All main bus bar work is large size aluminum channels composed of

Fig. 5. (Left)—Closeup of aluminum bus carrying 600-volt direct current from breaker panel in aisle, Fig. 4, through wall to hot-mill finishing stand motor. Fig. 6. (Right)—The 11,000-volt switchboard in motor room



two U-section pieces bolted back to back with an air space between. Bus composing main 600-volt circuit consists of two 12-inch channels. See Fig. 11.

Fig. 8 shows a closeup view of this bus work feeding one of the finishing mill motors. As can be seen the aluminum channels are ample size and are mounted on compression type insulators. An efficient system of cross bracing is employed to minimize effects of mechanical forces generated by large currents handled. Structural steel supporting framework furnishes substantial support to the bus work.

Looking north up the breaker aisle in Fig. 4, the circuit breakers and switching equipment for the direct-current generators are shown along the right hand side. Air circuit breakers and switching equipment at left in this view are for the finishing stand motors.

Protected By Breakers

Each generator is connected to the main bus through two circuit breakare so both sides of the line are disconnected in event of trouble. Similarly, each motor is connected to the main bus through two circuit breakers which completely disconnect it in event of trouble. These circuit breakers can be seen in pairs down the length of the breaker aisle in Fig. 4. The main 600-volt bus extends lengthwise this aisle and is constructed of large size aluminum channel mounted on structural supports firmly anchored and cross-braced across the width of the aisle. Fig. 5 shows sloseup view of the aluminum channel entering the breaker aisle through a brick wall into the adjoining room below one of the direct-current generators. There is considerable clearance afforded and ample support given the channel where it goes through the wall by employing a close-fitting block of asbestos composition as shown.

The main hot mill finishing drive motors connected to this 600-volt bus system are subjected to Ward-Leonard, variable-voltage control, with verniers to adjust speed of individual stands. This control is centered in the switchboard shown in Fig. 2, called the duplex board. Reading from left to right, the various panels are for: 250-volt auxiliary generator; 250-volt, direct current feeders; 440 volt, alternating current transformers and ties; 440 volt, alternating current feeders, exciter motor-generator sets; 600 volt, direct current generators Nos. 1, 2 and 3; 600 volt, direct current generators Nos. 4, 5 and 6; 600 volt, direct current motors for scale breaker, first roughing stand and first three finishing stands; 600 volt, direct current motors for last three finishing stands and the flying shear.

This switchboard is called the duplex board because here the equipment is first started up, preliminary adjustments made and the control switched to the master operating equipment in the control pulpits. As may be seen by reference to layout diagram, Fig. 1, several control pulpits are provided. The first one is mounted on the floor near the roughing scale breaker. Second control pulpit is in elevated booth on the wall immediately opposite and overlooking the hot-mill roughing stands.

Third control pulpit likewise is elevated on the wall and is opposite the hot-mill finishing stands. A view of operating controls and meters in this pulpit is shown in Fig. 7. The vertical handles seen in this view control the vernier adjustments on the individual stands to assure desired relation between speed of stands and each individual sheet as it comes down the line. It is the duty of the men at these controls to see that correct operating speeds are maintained and upon them largely rests the responsibility of satisfactory operation of the entire mill.

Fourth control pulpit is opposite the runout table and here are centered the controls for the coilers, transfer table, end piler as well as the runout table and flying shear. Control for all main drive motors in the hot mill is in the motor room. Control for auxiliary motors is grouped in elevated control houses located at various points throughout the plant. Typical of these is that shown in Fig. 3 which houses switchboards and control for the drives near the runout table, shear and transfer table. Referring to layout diagram, Fig. 1, this control house will be found designated as No. 4 just east of the hot mill runout table.

There are six such control houses

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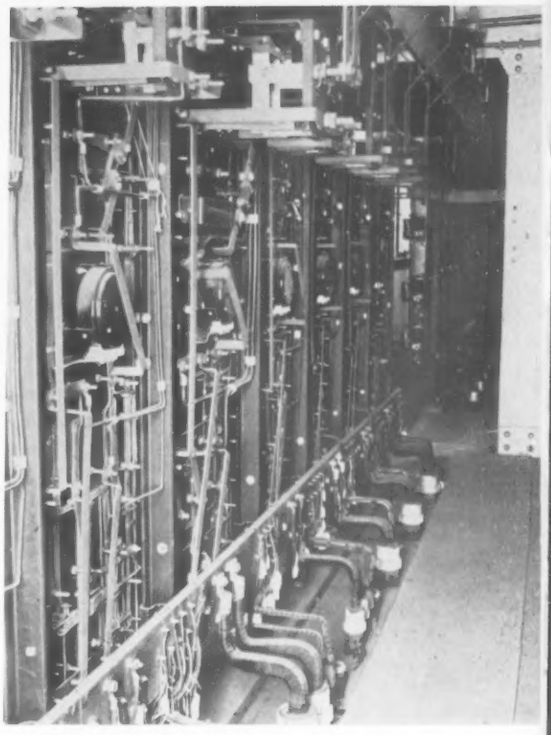
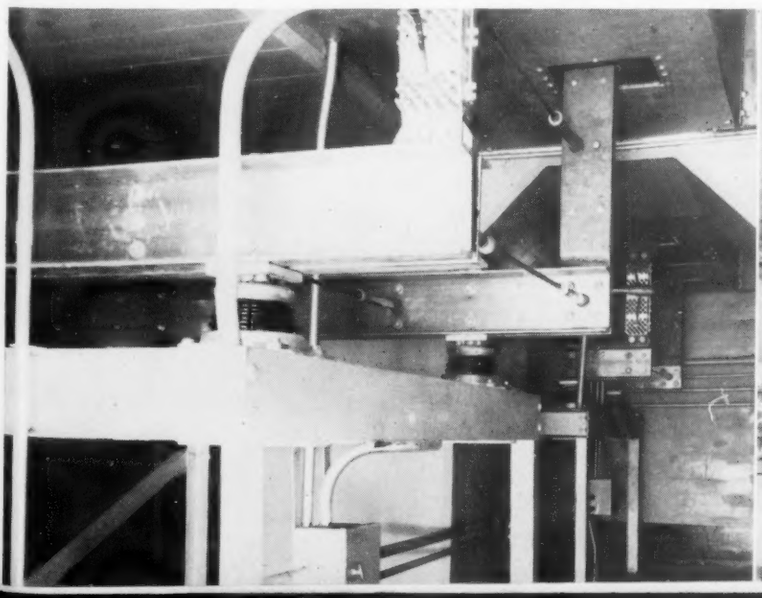
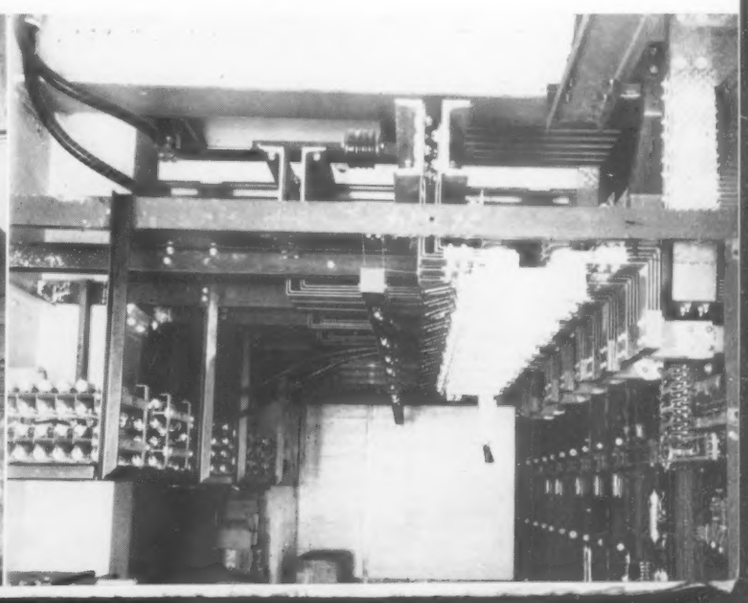
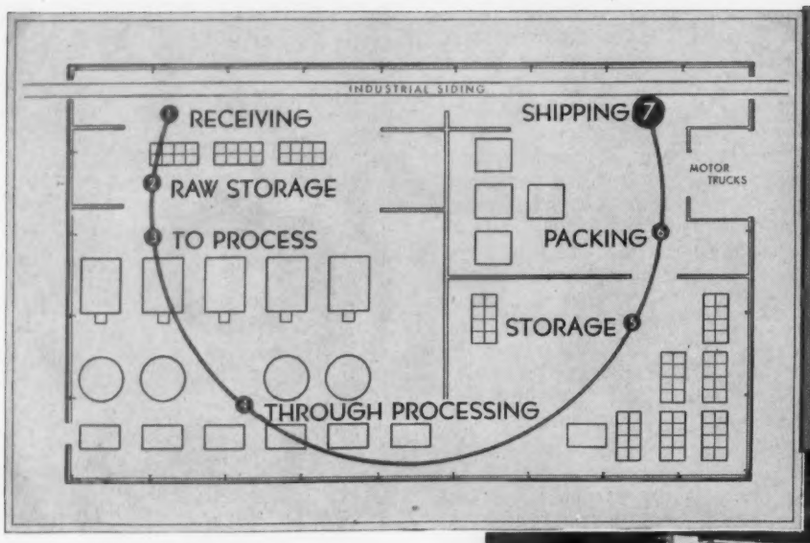


Fig. 10—View inside control house in Fig. 3 showing back-of-board wiring

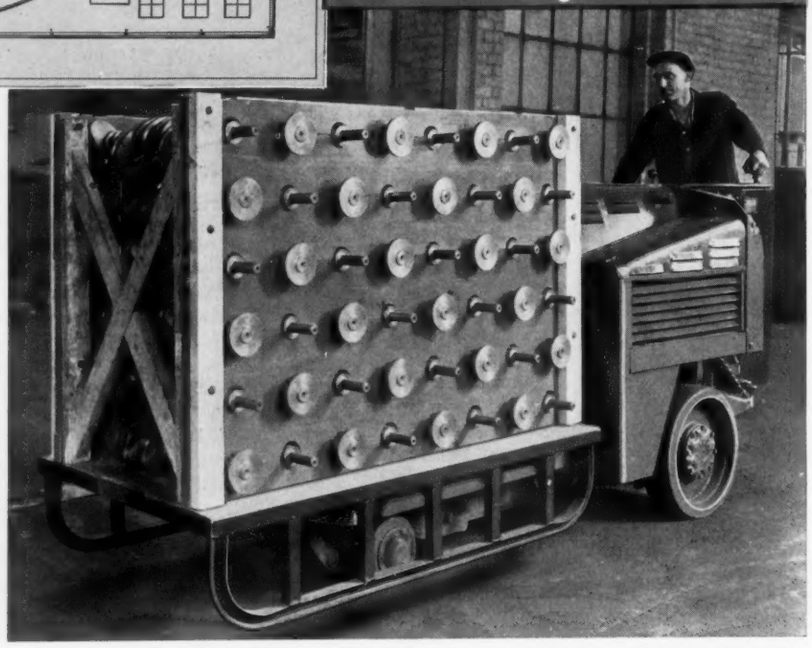
Fig. 8. (Left)—Closeup of aluminum channel on other side of wall shown in Fig. 5 where 600-volt circuits go up through floor to finishing stand motors. Fig. 9. (Right)—Overhead bus and disconnect switches back-of-board in control room below cold-mill motor room







"END OF THE LINE" FOR YOUR *Product...* BUT NOT FOR YOUR *Profits*



1. **Car to Receiving**
2. **Receiving to Storage**
3. **Storage to Process**
4. **Through Processing**
5. **Process into Storage**
6. **Storage to Packing**
7. **Packing into Car**

• The long trek of materials through your plant departments ends with the delivery of finished goods to freight car or road truck. But the *profits* you may have created by transporting economically should *keep accumulating* as the job is repeated thousands of times.

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The *Elwell-Parker System* of Materials Handling—Trucks, Tractors and Cranes—applies correctly-designed equipment and attachments for each operation. It eliminates waste and thus effects savings large enough to pay for itself quickly and *to keep earning net profits indefinitely.* The System is the product of Elwell-Parker's 32-years' successful experience designing and building continually modern Truck Equipment, and its proper application by trained Elwell-Parker Engineers.

For the benefit of your Management and Stockholders, find out how the Elwell-Parker System can *permanently* reduce load transporting costs in your own plant. An Elwell-Parker Engineer will help you get down to facts. Send for him now—by **Wire Collect.** The Elwell-Parker Electric Company, 4501 St. Clair Avenue, Cleveland, Ohio.

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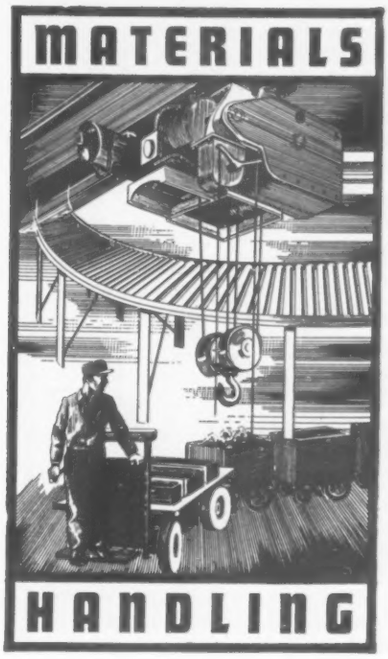


Auto Parts Plant

Straight-line flow of materials with conveyor belts, monorail conveyors, elevators and chute-fed bins mechanizes all handling operations. Work is delivered at table level

■ VIRTUAL elimination of manual operations usually responsible for excessive fatigue on the part of employes is realized in the new plant of the Ternstedt Trenton division of General Motors Corp., Trenton, N. J., where 900,000 square feet of floor space is devoted to manufacture of autobody hardware and fittings.

This objective was achieved by a carefully designed system of handling and routing materials from raw to finished products using straightline flow of materials and reduction of unnecessary physical exertion as principal elements in layout of departments and sequence of operations.

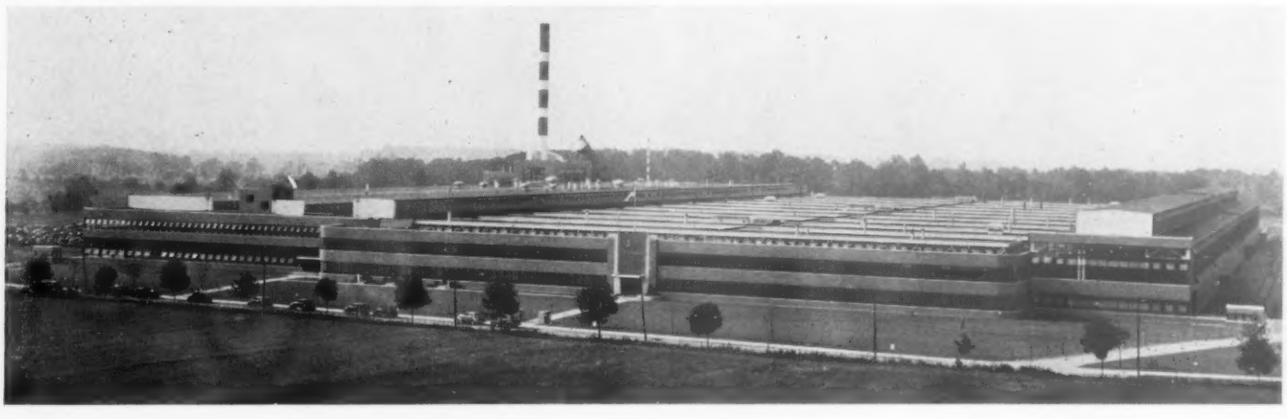
Handling operations are mechanized through use of monorail conveyors, conveyor belts, elevators or chute-fed bins. Such handling equipment, whatever its nature, delivers work at correct table level so no bending or reaching is necessary. Banks of materials at strategic points throughout the plant prevent layoff of operators farther along the production cycle in event of equipment failure. Complete emergency lines likewise have been set up with this in view.

It is the plan, for example, when regular production is reached to maintain a bank of 5000 garnish moldings between the manufacturing and finishing departments, enough to keep the latter running for a full 8-hour shift should production cease entirely. In addition, a month's supply of raw materials, figuring 20 working days in the month, will be kept on hand at all times in the 75 x 920-foot storage craneway. This will include nearly 2500 tons of coil, strip and section steel; 900,000 pounds of zinc; 27,000 pounds of copper; and 36,000 pounds of aluminum. Large storage hoppers between many of the individual machines permit an operator to leave his post as long as 15 minutes without seeking some one to relieve him.

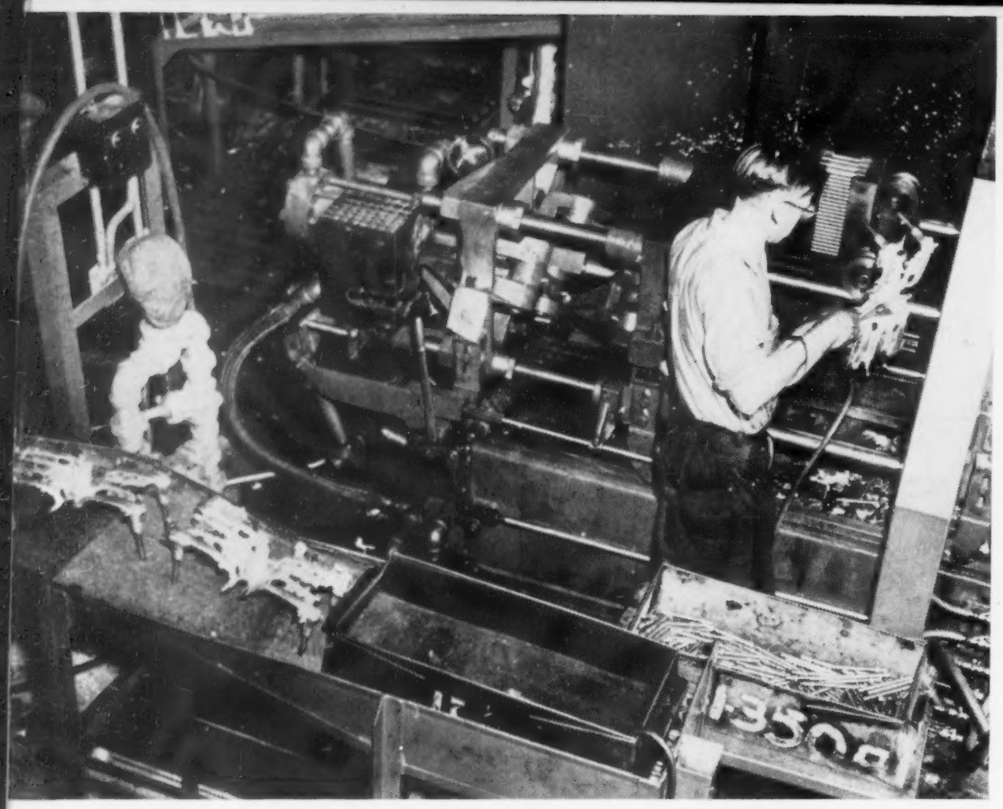
At the western end of the plant and at right angles to the 23 manufacturing bays is the receiving and raw material storage craneway with a train shed capable of accommodating 18 cars at a time, in addition to a truck receiving dock. Across other end of the plant is another section 200 x 920 feet divided into an upper and lower floor. It serves as warehouse and shipping room and includes an enclosed train shed and truck loading dock similar to that provided in the receiving area.

It will be possible to store a full 18½ days' production in the warehouse, or some 46,250 completed sets of body hardware. Thus Ternstedt can supply assembly plants for a short time even if manufacturing operations are interrupted completely.

Layout of the new plant and equipment permits similar parts to be fabricated on the same lines by changing dies or by skipping various operations. About 787 different



Front view of 20-acre Ternstedt plant at Trenton, N. J., now making auto body hardware and fittings for eastern and southern assembly plants of General Motors



A battery of 19 die casting machines, such as this horizontal toggle type making door handles, supplies body hardware. Castings are made four at a time with steel inserts cast in position

items of hardware are needed for a single auto body. Since individual lines for each of these parts is impractical, 70 per cent more space than otherwise would be required is contained in the warehouse to provide for rotating production.

The 2-story portion housing the offices extends 400 feet across the front of the plant. Hospital, testing laboratory, employment and factory offices are situated on the ground floor with administrative offices upstairs.

Immediately behind the offices is the mechanical hardware department where window regulators, seat adjusters, locks and hinges are produced. Next is the department devoted to the fabrication of rolled sections, including roof bows which reinforce solid steel tops, sash and garnish moldings. Various parts for no-draft ventilation systems, among others, are manufactured in the fourth major division, and die-cast parts, such as door handles and other interior and exterior fittings, in the fifth.

Mechanical hardware department includes three separate sections; the first and second sections contain a battery of 12 welding machines, ranging from 15-kilovolt ampere spot welders to 250-kilovolt ampere projection welders, and a group of 8 to 150-ton presses. First section of this department produces seat adjustment mechanisms, cowl ventilators, drip shields for the no-draft ventilation system, door bumper caps, door check links, compartment door hinges, trim and windhose retainers and window regulators.

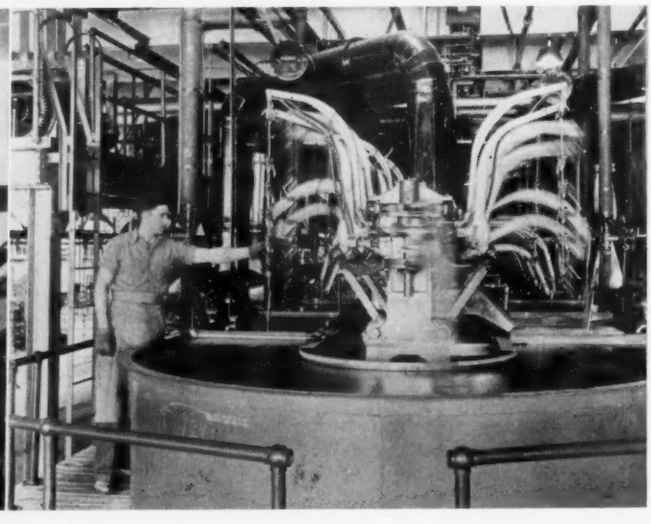
Eight fabrication lines in combination with two separate assembly lines precede enameling of seat adjusters. Also four fabrication and assembly lines follow enamel. A separate line is provided for cowl ventilators, and four fabrication lines in combination with one assembly line for window regulators. The cowl ventilator handle and linkage is served by two fabrication lines, an assembly line prior to black enamel and one assembly line following enamel.

All unexposed parts finished with a coating of black enamel are run through a huge overhead enameling setup 100 feet long, served by a 1031-foot monorail conveyor. Such parts as bumper caps, door check link assemblies, cowl ventilator cover assemblies and door lock strikers, on the other hand, go through a spray bonderizing treatment combined with a ground coating, the final finish being given them at assembly plants to which they are shipped after completion.

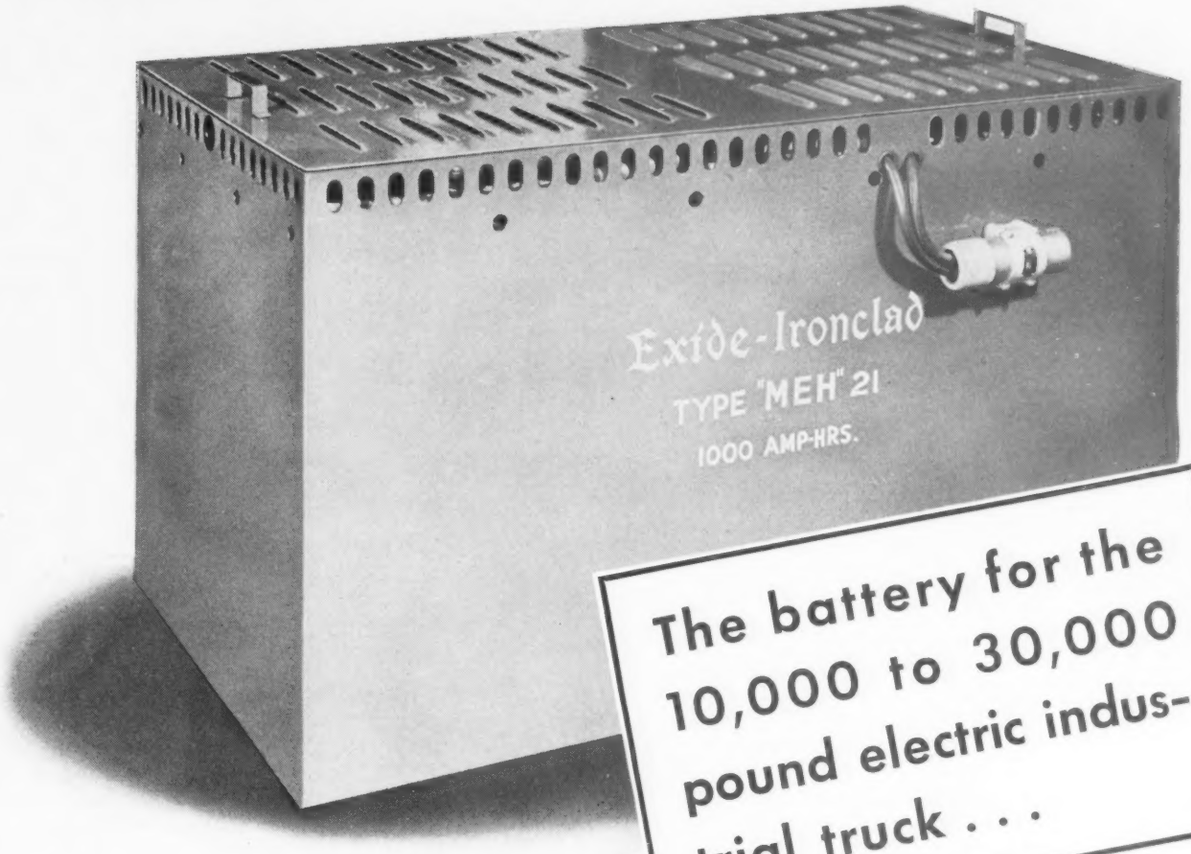
Bonderizing oven is 150 feet long and, like the enameling oven, is suspended at truss level, about 14 feet above the floor. A 1125-foot monorail serves ground coat and bonderizing.

Second section in mechanical hardware department produces deck compartment, door and remote control locks. Zinc coated strip stock is used in the manufacture of all parts where no welds are required; others are zinc plated upon completion of

At left is special equipment for graining garnish moldings in an air-conditioned room. Chromium plating at right is done in this 54-foot closed-circuit machine. It is automatic with aluminum arms riding on cams to lift racks into and out of various solutions



"MEH" Exide-Ironclad



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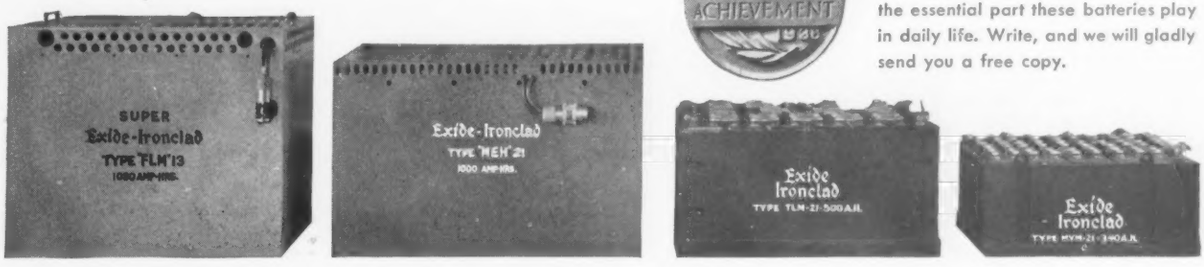


An innovation in polishing equipment is this 64-foot straight-line polishing machine on which the operator is racking window regulator handles. A chain carries them the length of the machine under a series of polishing heads like that at right

the fabricating operations to prevent possibility of corrosion.

Third section in this department is the outside door hinge unit. Elevators, some of which have both horizontal and vertical movement, are employed in conjunction with slides to convey the parts from one machine to the next. Hinge straps are produced from uniform blanks of 9/32-inch, cold rolled steel.

Here large divided storage hoppers are essential due to variety of hinges produced, requiring three different female and four male straps. First operation in making heavy hinges is handled by three 150-ton presses, one for blanking male straps, the second for female, while the third alternates. This is illustrative of the production scheme of the whole unit. By-passes are provided at frequent intervals in each of the various lines.

Garnish molding department makes roof bows, compartment gutters, sash assemblies, sash brackets, cloth clips, front drip moldings, inner panel and sash cams, garnish moldings for the doors, windshield, rear quarter and back window—all in types to meet requirements of various body styles. Here a variety of roll forming machines of special design are used.

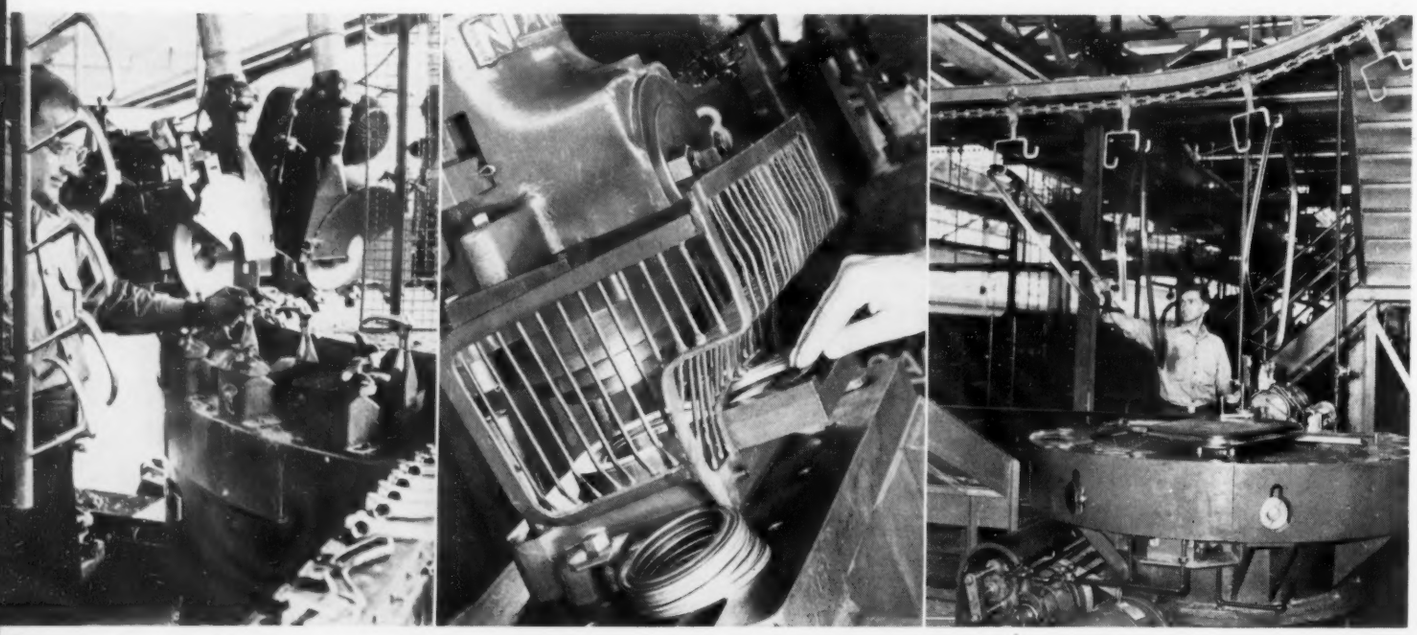
These include five separate rolling mill lines and a battery of 133 presses for forming, sizing and other operations. These presses range in capacity up to a 180-ton toggle press, easily the largest unit in the plant.

An important development in garnish molding is the salvage center which receives parts from every corner of the department. It has a 1200-foot service monorail that contacts all inspection stations. Whenever a part fails to satisfy the inspector, it goes to the salvage center on the salvage monorail. Rejected parts as a rule require only a minor adjustment to render them fit for service so suitable equipment is provided manned by expert mechanics who make the necessary adjustments and then return the parts to their proper stations along the processing lines.

A front door garnish molding consists of an upper molding of channel section and a trim panel, the lower sill of the window. The upper molding starts as a continuous formed channel strip, which is cut to exact length and then bent to the required form on specially designed automatic bending machines. In direct contrast to this, the lower trim panel is a stamping made two at a time entirely on presses. Naturally each piece follows an entirely different line, but both converge at a battery of flash welding machines, in which the upper and lower panels of the right and left-hand door moldings are united into strong one-piece frames.

Paint finishing department occupies nearly 60 per cent of the gallery floor extending over warehouse and shipping room. Three separate paint lines in this department are served by overhead monorail conveyors which bring the work within easy reach of the operators and at the most convenient level. Wood graining effects are produced in two separate graining rooms completely air-conditioned. In addition, the entire finishing department is provided

(*Please turn to Page* 85)



Rotary polisher at left handles die cast door handles which pass under polishing wheels set at different angles to completely cover exposed surface. In center, a special guard on an inclined punch press protects operator as he feeds in dome light bezels for a forming operation. At right, formed strip steel sections are bent automatically to shape in this equipment producing garnish moldings

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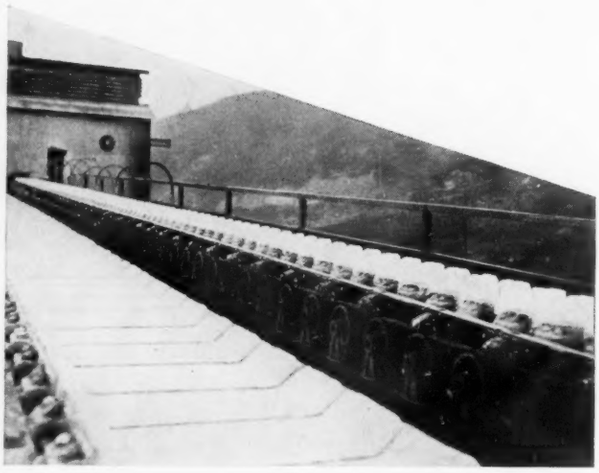

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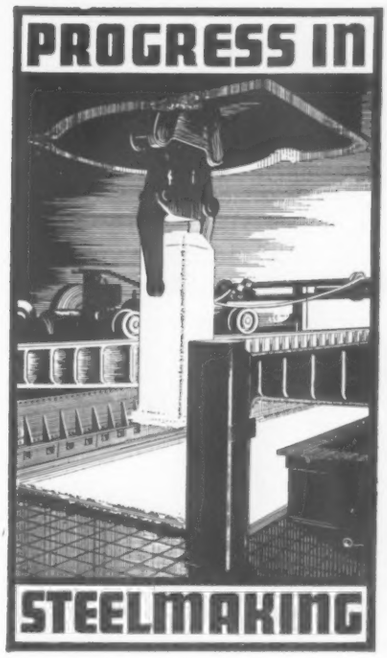


Carbon Determination

New method of measuring coercive force in steel samples requires only one third the time of chemical analysis. Bureau of mines reports on year's investigations

■ ONE of the interesting problems undertaken by the bureau of mines, Washington, during the past year, and which is now being brought to a satisfactory conclusion, is determination of the carbon content of samples of plain carbon steel by measurement of the coercive force. This investigation is one of many summarized in the annual report of the bureau's metallurgical division for the fiscal year, 1937-38. The report was prepared under the direction of R. S. Dean, chief engineer of the division.

Sections of the metallurgical division reporting progress during the year are the metallurgy of steel, blast furnace studies, metallurgical fundamentals, special studies, electrometallurgical, ore dressing, nonferrous metallurgy, and copper metallurgy.

According to the statement of the metallurgy of steel section, the measurement of carbon content in steel by the coercive force method can be conducted quickly and easily on the coercimeter developed by the special studies section. Furthermore, the entire process of taking the sample and making the determination can be carried out by a furnace helper in about one-third of the time required for a chemical analysis.

The special studies section had demonstrated the necessity for saturating the sample in the preliminary magnetization process. Experiments were made, however, in which the sample was subjected to a field of about 550 oersteds in the hope that this intensity of magnetization would be sufficient to give consistent results. As such a field strength can be obtained in the coercimeter, it appeared possible that the extra operation of magnetizing the test piece in a separate magnet might be avoided. The investigation succeeded only in confirming the necessity for saturating the sample magnetically.

After some preliminary and rather unsuccessful trials in one of the local steel mills, the apparatus was brought back to the laboratory for further study under conditions that could be fixed more definitely. In particular, the composition of the molten steel from which specimens were cast could be controlled so that the carbon content changed. In the steel mill the frequent additions of alloying and deoxidizing agents had proved rather disturbing. After a number of changes in apparatus and procedure, a method of securing and testing the sample was developed which gave consistent results over a range from about 0.05 to 0.70 per cent carbon.

After a satisfactory correlation between force and carbon content was obtained, the next step was to construct a coercimeter of a more portable type. As the direct-current circuits needed for operating the coercimeter are not usually found on open-hearth floors, it was desirable that the apparatus be self-

Memorial Made From Torch-Cut Steel

■ **Arizona highway department recently erected this memorial to commemorate the Wickenburg-Ehrenburg stage massacre of 1871. Stagecoach, driver and horses were flame cut from steel plate as well as the tablet below whose outline simulates state of Arizona. Letters on tablet were imposed by arc welding. Photo courtesy Victor Equipment Co., San Francisco**

contained. It was arranged, therefore, to operate the entire outfit from a 12-volt battery.

An additional change was to construct a new mold that would produce a constriction in the sample at the desired point for breaking off the 1¼-inch length actually used for testing. A smooth mold had been used for the experiments conducted in the laboratory, the samples having been cut off by a thin cutting wheel; but as the method was not as fast as desired, and the cutting equipment was not portable, the mold with a constricted portion appeared more suitable for use around a steel plant.

As it was desirable that the first trials should be made where conditions were reasonably constant, an invitation to use the apparatus at the Steubenville, O., plant of Wheeling Steel Corp. was accepted. The principal product of this plant is steel containing 0.08 to 0.10 per cent carbon and a total of alloying elements, including manganese, amounting to perhaps 0.25 per cent. Under such conditions, the furnace practice is fairly uniform, and for this reason conditions are favorable for experimental work.

First trials with the new apparatus were unsuccessful. Different procedures, therefore, were studied to establish the conditions necessary for consistent results. For example, the interval between removal of the specimen from the mold and immersion in the quenching medium was varied. Other media than water were also used for quenching.

Since no procedure gave results that were as consistent as those obtained in the laboratory, it was decided to try the smooth mold that had been employed in the laboratory experiments. This substitution and use of a fixed temperature of the water for quenching were found to give greatly improved results. As the consistency of the readings appeared to be satisfactory for various fixed intervals between removal from the mold and quenching, the method finally adopted was to drop the sample in water at once.

Data on samples from a number of heats of steel were used to establish a curve between the coercive current and the carbon content of samples quenched in water at 21 degrees Cent. Over the intervals of 0.10 to 0.20 per cent carbon and 0.35 to 0.70 per cent carbon, the curve can be represented by two straight lines; in fact, the two straight portions can be projected to meet at 0.22 per cent carbon without much departure from the most probable position of the curve.

The straight segment for the low carbon region is much steeper than that for the high carbon. When the proper treatment is followed, the carbon content read from the curve and the value obtained by analysis agree within 0.02 per cent. In rare cases, exceptions have occurred in the range of 0.10 to 0.15 per cent carbon when readings indicated carbon contents as much as 0.03 or 0.04 per cent too low.

Describes Method

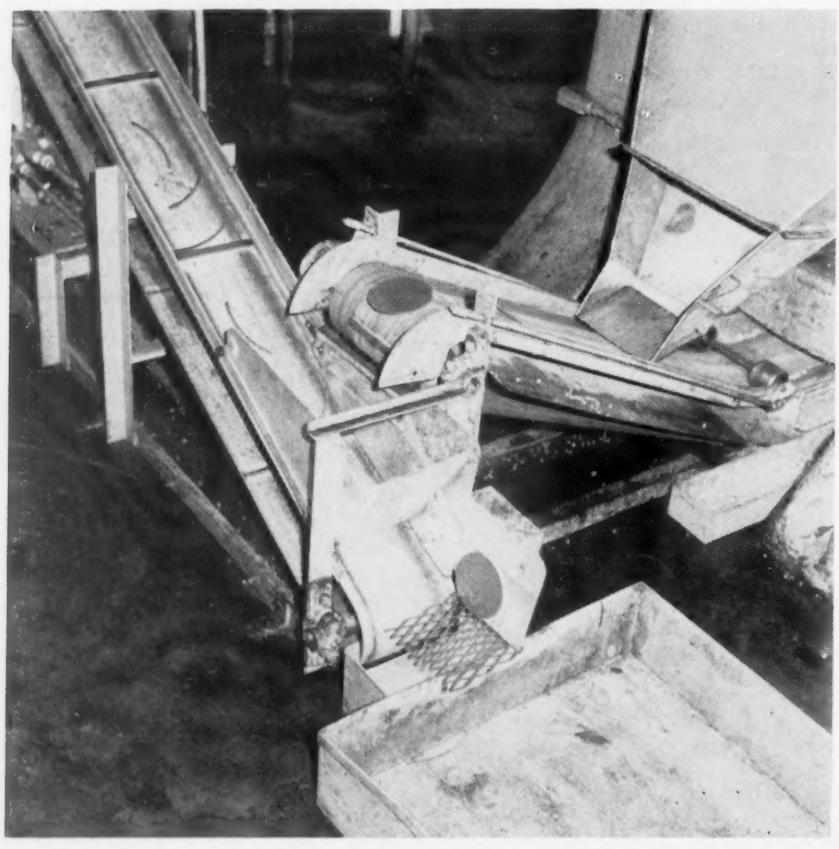
This new method of carbon determination was described in a paper prepared by B. A. Rogers, Karl Wentzel and J. P. Riott, associates of the bureau of mines, and presented before the annual meeting of the American Society for Metals in Detroit, Oct. 17-21. An abstract of this paper, containing some additional information on the methods, was carried in the Oct. 31 issue of STEEL, page 52.

In another investigation, the bureau found that the magnetic behavior of open-hearth furnace slags, particularly their susceptibility-temperature curves, proved to be so complex that attention was turned to simpler synthetic slags. Melts were made of iron oxides alone, silica and iron oxide together, calcium oxide and iron oxide, and the combination calcium oxide-silica-iron oxide. Most of the melting was conducted in low-carbon steel crucibles in the high frequency furnace. The rest of the heats were made with an oxyacetylene torch, a fire brick that had been hollowed out being used as a crucible. In neither case was any attempt made to influence the surrounding atmosphere.

When iron oxides are melted in air in an iron crucible, the product consists roughly of 85 per cent FeO and 15 per cent Fe_2O_3, regardless of the composition of the charge. The instability of this so-called "ferrous" oxide is well known. Different experimenters have concluded that below 570 degrees Cent. the tendency of this material is to break up into Fe_3O_4 and Fe, while the reverse process sets in above this temperature. Such a decomposition would account for the marked increase in susceptibility of iron oxide prepared in this way when heated slowly.

The effect can be observed in a few minutes at 250 degrees Cent.

Uses Selective Conveyor Setup



■ **Inland Mfg. Co. division of General Motors Corp., Dayton, Ohio, employs this arrangement to separate disks from other scrap coming down the chute from a big punch press at right. Disks fall flat on first short conveyor which delivers them to second conveyor so they roll on edge along side of this conveyor, out through a vertical slit and into large pan on floor. Other pieces of scrap go up second belt conveyor to a hopper which dumps into buckets going to scrap bins**

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and becomes more rapid at higher temperatures. The temperature at which iron and Fe_3O_4 begin to reassociate is less easy to determine because of the rapid decrease in susceptibility of Fe_3O_4 that occurs at about 570 degrees Cent. It may be noted, however, that a sample of iron oxide of the approximate composition stated did increase in susceptibility when held at 550 degrees Cent. and become less magnetic when held at 579 degrees Cent. The iron that is liberated below 570 degrees appears to become recombined with the iron oxide before it reaches its Curie temperature of 770 degrees Cent.

The susceptibility at room temperature of the high silica and low silica melts did not differ greatly, but the two types behave quite differently at elevated temperatures. Those with a low silica content exhibited an increase in susceptibility with temperature in a manner similar to that shown by the iron oxide melts. When the percentage of silica was sufficient to combine with all of the iron oxide, a practically continuous fall in susceptibility was observed. The temperature at which some of the high silica melts exhibited Curie points indicated the presence of magnetite, whereas other compositions showed marked decreases in susceptibility at temperatures that did not correspond to any of the familiar magnetic substances.

Calcium oxide-iron oxide in the region $2CaO.Fe_2O_3$ exhibited a Curie point not far above room temperature, after which the susceptibility did not change as the specimen was heated.

The calcium oxide-silica-iron oxide melts revealed a complexity scarcely less confusing than the behavior shown by the furnace slags. They appeared too complex to pursue further at this time.

More Iron Indicated

Analyses of both the silica-iron oxide and calcium oxide-silica-iron oxide heats for metallic iron by the copper sulphate method indicated quantities of iron much greater than that estimated from measurements of susceptibility. The mercuric chloride method gave much lower values for the percentage of metallic iron, but the results were not consistent for different amounts of sample. A new and more satisfactory method of analysis for metallic iron in the presence of iron oxide would be desirable. The reagent sodium salt of diphenolamine sulphonic acid has been suggested as worth investigating for the purpose, but as this reagent does not appear to be on the market, no work was undertaken.

Some experiments were tried on the relation between loss of weight and gain in susceptibility of furnace slags heated in a hydrogen atmosphere over extended periods. The increase in susceptibility was found to be in direct proportion to the loss in weight, apparently regardless of the temperature of the treatment. Similar experiments on synthetic slags of calcium oxide-silica-iron oxide gave almost identical results. Tests with the Curie point apparatus showed that magnetite was formed at low temperature treatments while the iron content increased at high temperature.

Studies Continued

The academic phases of the investigation of metal-slag dispersions were continued in the past year. The previous annual report described experiments in which iron-zinc amalgams were poured into molten $CaO.SiO_2$ glass in an effort to obtain a dispersion of metal in slag. These studies were continued with aluminum-iron amalgams. The results were negative.

A variation of the foregoing experiments was to drop iron nitride, prepared by passing nitrogen gas over powdered metallic iron at 450 degrees Cent., into the calcium silicate glass. This trial yielded a larger amount of small particles than had been obtained previously and a bluish color in some parts of the slag, but was not considered sufficiently promising to follow up.

With the object of throwing more light on the general problem of emulsions, some trials were made on the effect of degree of dispersion in aniline and hydrochloric acid mixtures upon the pH value. Hydrogen electrodes were prepared and tried but found unsuitable, probably because of the poisoning action of substances in which they were immersed. A Beckman acidimeter equipped with a glass electrode was tried next and found suitable. The data obtained, however, demonstrated that the reaction between aniline and hydrochloric acid proceeded stoicometrically without regard to the size of the aniline particles present. Similar experiments were made with dispersed oleic acid and a zinc chloride solution but the results were again negative.

By way of exploring possible uses of electrolytic manganese, which was produced by the electrometallurgical section, a number of alloys containing this material have been made. At the present time, however, results of various tests have not been correlated sufficiently to justify giving an account of this work here.

Progress has been made in preparing a book on the minor elements of steel. This book will be one of the monographs published by the Engineering Foundation on iron and its various alloys. It will describe the effects of phosphorus, sulphur, and some other detrimental substances that are found less commonly in steel. Much of the material on phosphorus and sulphur has been collected, and part of that on phosphorus has been prepared for publication. At present, a sample chapter and an outline of the boon is being prepared for submission to the Alloys of Iron committee.

The practice of desulphurizing molten pig iron through use of sodium carbonate or of mixtures in which sodium carbonate is the active reagent has been revived in recent years. As the allowable limit of sulphur in hot metal for the open hearth is more carefully controlled, use of supplementary methods of desulphurization in the blast furnace ladle or hot metal mixer is becoming more attractive.

Experiments recently completed by the bureau indicate that by proper application of calcium carbide it may also be used to supplement the desulphurization obtained in the blast furnace and that the sulphur content of molten pig iron may be reduced rapidly to a value approaching 0.01 per cent. The carbide treatment would be applied to hot metal in the ladle or mixer.

Method of Treatment Important

The method of treating the hot metal was found to be important. To obtain efficient utilization of carbide it should be mixed with a suitable flux and allowed to react below the surface of the metal bath. Sodium chloride was found to be as efficient as any flux tried and has the additional advantage of being comparatively inexpensive.

In laboratory experiments, the mixtures of calcium carbide and flux were pressed into briquets and applied to the hot metal by means of a graphite and iron pipe holder. In plant practice a suitable holder might be used, or a layer of the mixture might be rammed into the bottom of a hot ladle where, due to its high melting point, it would be released slowly upon addition of hot metal.

Desulphurization by other carbides has been considered, but calcium carbide appears to be the most suitable for treatment of pig iron. Preliminary experiments show that low carbon steel may also be desulphurized with calcium carbide, but further investigation is necessary to determine the carbon pick-up from the treatment.

Studies were undertaken of equilibrium conditions in the homogeneous slag reaction. Since desulphurization of pig iron in the blast furnace depends mainly on the rate of reaction. equilibrium measurements are of less importance but show the extent to which

iron oxide must be eliminated before desulphurization can proceed.

Data also have been obtained to show that a separate phase consisting of essentially ferrous sulphide may be precipitated rapidly from a high-sulphur blast furnace slag upon the addition of a few per cent of iron oxide. Unreduced iron ore reaching the hearth of the blast furnace would cause rapid precipitation of ferrous sulphide and resulphurization of any metal it contacted. This sulphur would then have to be eliminated by the much slower process of desulphurization.

Determines Molecular Solubility

Although direct determination of ferrous sulphide in blast furnace slag is not possible, a close approximation of its molecular solubility may be obtained in another way. When finely ground slag and ferrous sulphide were mixed and melted in a platinum crucible, spontaneous dispersion of the sulphide phase resulted. The minimum amount of ferrous sulphide necessary for transformation of a colloid was found to be in the range of 0.1 to 0.15 per cet in a base slag composed of 45.5 per cent CaO, 13.5 per cent Al_2O_3, and 41.0 per cent SiO_2. The dispersion characteristics and solubilities of other sulphides encountered in blast furnace slags are being determined.

In a study of equilibrium conditions in a slag-metal reaction, equilibrium should be approached from each direction and there should be a minimum of contamination of the reacting substances by the refractory container in which the materials are melted. The lack of a suitable refractory container for both slag and metal has hindered the study of slag-metal reactions in the past. In this investigation, the refractory problem was eliminated by development of three types of rotating induction furnaces with which it was possible to form a liquid crucible from one of the reacting substances, in this case liquid iron. An improved method of preparing magnesia and other refractory crucibles also was developed.

Tarnishproofs Silver

■ Metallurgists at England's Cambridge university have discovered a new process for rendering silver untarnishable, it was revealed at a recent British meeting. The new process consists essentially in treating silver with an invisible film of aluminum or beryllium oxides. Although this discovery will not be applied immediately on a commercial scale, it is believed that further research will simplify the process sufficiently to make it industrially marketable.

Furnace Stress-Relieves Vessels That Are Longer Than Itself

■ UNDER Paragraph U-68 of the A. S. M. E. code for unfired pressure vessels it is required that all welding be examined radiagraphically and that the completed vessel be stress relieved by firing in a furnace. There are certain credits for stress relieving or X-raying, or both, under the API-ASME specifications, also.

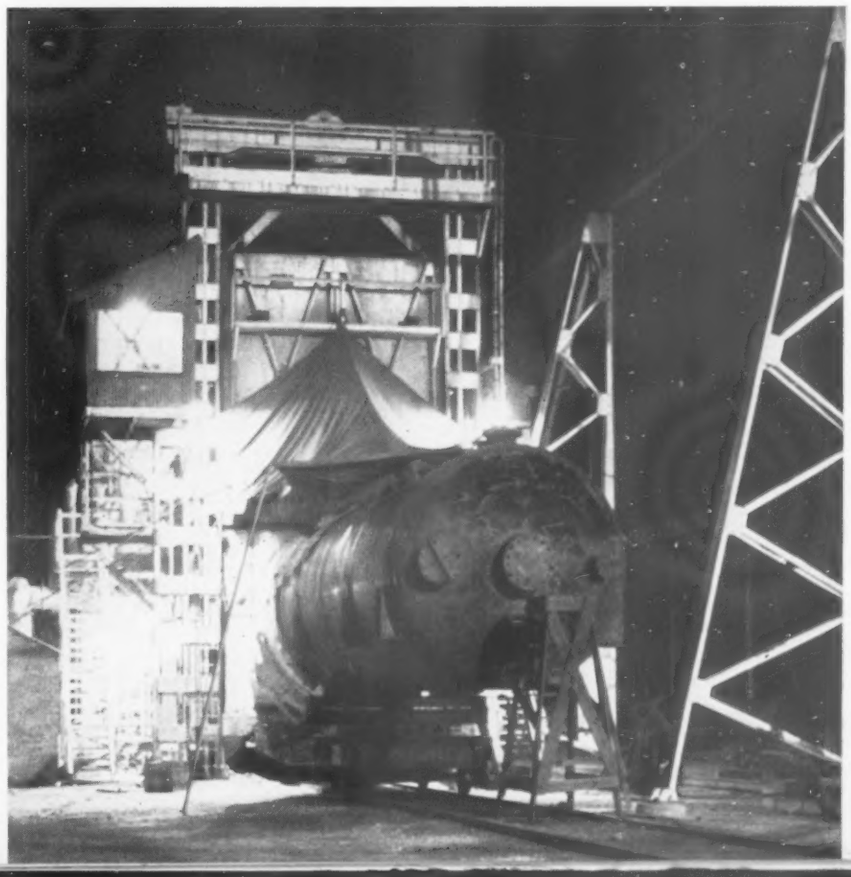
Possibly one of the largest furnaces for handling this work is in use at the Birmingham, Ala., plant of Chicago Bridge & Iron Co. Here a furnace, 80 feet long inside, 14 feet wide and 17½ feet high to the crown of the arch, stands separate from other building structures. It is connected to the erection bay of the shop by a standard gage track so vessels can be loaded using heavy shop cranes afterwards run into the furnace.

Bottom of furnace consists of a specially constructed 28-wheel car 83 feet long, floored with 4½ inches of insulating concrete and 13½ inches of insulating firebrick. It is fitted with Meehanite supports which carry the vessel or charge. Car will carry up to 160 tons. Sides and arch of furnace employ 9 inches of insulating firebrick. Doors are lined with 10 inches of insulating concrete. Since doors are at both ends of the furnace, it is possible to handle vessels of any length by allowing them to project out. A temporary brick enclosure is built around the vessel where it leaves end of furnace, sealing the furnace. Typical of work handled is the digester being stress relieved in the accompanying illustration. This unit is 9½ feet in diameter and 85 feet 2 inches long, entirely welded and was handled in two operations with an end extending out of the furnace each time as shown.

Furnace is fired with by-product coke oven gas. There are 64-low-pressure type gas burners divided equally between top and bottom of the furnace. Combustion gases leave the furnace through 32 flues, rising from furnace bottom to a single stack at the center. Burners are divided into 12 groups or zones with a balanced-valve regulator for each. For each zone there also is a dial type recording pyrometer which actuates a 4-position controller on the air-supply pipe for that zone. Also a pressure regulator in the instrument room actuates a butterfly valve in the main stack to maintain a slight pressure inside the furnace.

Two 6-point recording pyrometers of the strip-chart type furnish an actual record of vessel temperatures as indicated by 12 thermocouples attached directly to the charge. Maximum furnace temperature is 2000 degrees Fahr.

Here an 83-foot digester tank, all welded, is being stress relieved in a furnace only 80 feet long. Using two heats, one end at a time is handled, permitting other end to extend from furnace as shown



Flame-Hardening Fixture Handles One Hundred Parts

■ AN OHIO builder of power shovels, trenching machines, back fillers, clay unloaders and road machines utilizes many cast steel parts for sprockets, gears, pinion and clutches of various sizes and types. These are cast in the company's own foundry using SAE 4150 steel. Due to the hardness of this material, it was necessary to machine the castings at low speeds. In some cases, furnace hardening was not required but it usually was necessary to anneal, machine and furnace harden the parts.

Seeking a means to increase machining speeds and to improve the quality through localizing the hardening action to those points where it was desired, the company developed a flame-hardening procedure which has been used successfully on a wide variety of work.

A preliminary investigation indicated that a change from SAE 4150 to 4140 steel would be beneficial. This change was made at the same time flame hardening was introduced and as expected it resulted in reducing both foundry and machine shop costs.

Most essential to the success of the flame-hardening treatment was the development of a jig that would enable a wide variety of parts to be handled speedily, efficiently and economically on a high production schedule. This necessitated a jig that would take care of at least 100 parts. The device shown below meets these requirements.

This view shows the side elevation of the parts forming the flame-hardening water tank and work-holding jig. Water and drain tank itself is 5 x 2½ x 2½ feet. The various part numbers are as follows: 1—tank, 2—radiagraph track, 3—gear or sprocket being hardened, 4 and 5—cone centers holding work, 6—shaft supporting centers and work, 7—nut with handles for clamping work in centers, 8—bushing spacer holding item 4 in place, 9—pivot head of shaft 6, 10—bolt and nut for locking pivot, 11—screw for raising and lowering center post, 12—center post, 13—center post guide, 14—steel channel welded to tank to support center post guide, 15—key and keyway in center post and guide, 16—thrust bearing block for elevating screw 11, 17—water drain and valve. This jig accommodates gears or sprockets up to 30 inches outside diameter, hub bores 1½ to 10 inches diameter and hub lengths up to 18 inches.

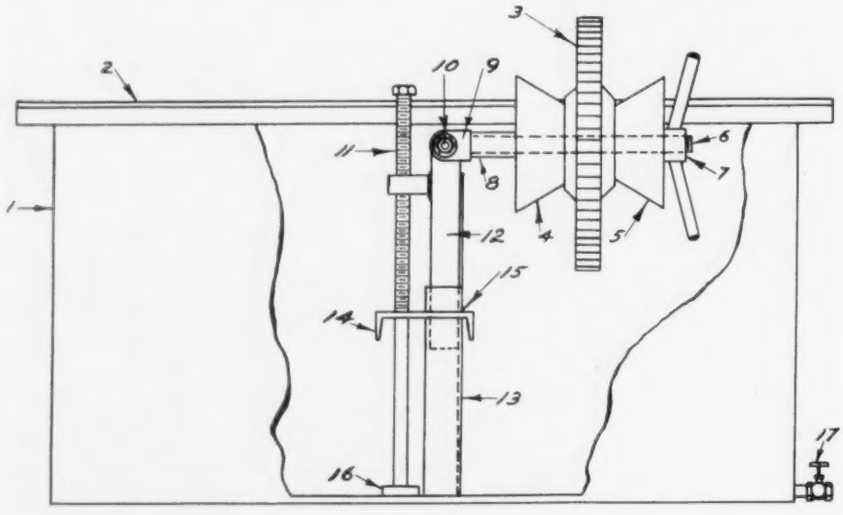
After only two months use, more than 100 different parts are already being flame hardened in this equipment. These include five different types of sprockets, hub with clutch for safety sprocket on jackshaft, bevel gears in all diameters.

Procedure employed is quite simple. The work is clamped between the two cone elements of the jig and the height adjusted to permit the required amount of clearance above the surface of the water in the tank. Torches with multi-flame tips are mounted on a radiagraph, or motor-driven carrier, which travels lengthwise along the back side of the tank as shown in the illustrations.

A spring dog or clamp is mounted on the front side of the tank to hold the tooth being treated in proper position. Then after heating each tooth, the part is rotated till the spring dog snaps the next tooth in correct position. Jig is arranged so teeth line up with the runways on which the torch travels.

Results have been quite satisfactory, the hardness developed being confined to the wearing surfaces and a considerable cost reduction being effected due to use of the lower cost steel and to increased machining speeds possible. Also a significant improvement in the quality of the product has been made possible by hardening *all* the wearing surfaces.

Diagram showing parts employed in the universal fixture described here. Drawing courtesy Air Reduction Sales Co., New York



Locomotive Tests Begun

■ Road tests to determine ultimate possibilities of present steam passenger locomotives were begun at Ft. Wayne, Ind., recently as part of a joint research project of railroads and locomotive builders looking to further improvement of steam power.

A 1000-ton experimental train, consisting of a dynamometer car with sensitive recording instruments, a baggage car and more than a dozen passenger coaches, was run at full speed from Ft. Wayne to Valparaiso, Ind., a distance of 115 miles. Instruments recorded in permanent form speed of the train, pull of the engine and a variety of other technically important data. This same test train will be conducted under similar conditions on the Chicago & North Western railway and on the Union Pacific railroad, near North Platte, Nebr.

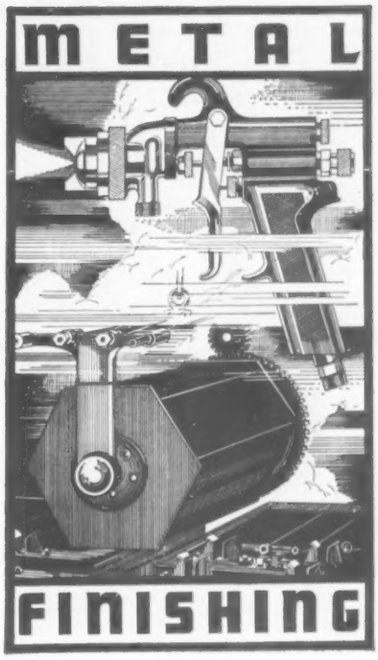
This research project was begun by the mechanical division of the Association of American Railroads. In 1937 a special committee was appointed to develop a reciprocating steam locomotive capable of handling 1000 trailing tons at 100 miles per hour on level tangent track, an accomplishment said to require from 5000 to 5500 cylinder horsepower.

Aids Aluminum Soldering

■ Aluminum is hard to solder because of the oxide film that forms, preventing molten solder from alloying with the base metal.

According to *The Foundry*, the most practical method of improving this bond is to abrade surface of the aluminum under a film of molten solder so that solder can wet the freshly exposed surface before it comes in contact with air. When a small amount of solder has been melted on the surface, solder is rubbed or worked with a wire brush. This abrades the aluminum, removes oxide and exposes a clean surface.

ADVERTISING PAGES REMOVED



Fast Galvanizing

New units increase distance from flux line to last pair of bottom rolls to get higher galvanizing speeds, decrease alloy layer. Indicate ultimate development of continuous strip galvanizing equipment

By E. A. MATTESON
Sales Engineer
Aetna-Standard Engineering Co.
Youngstown, O.

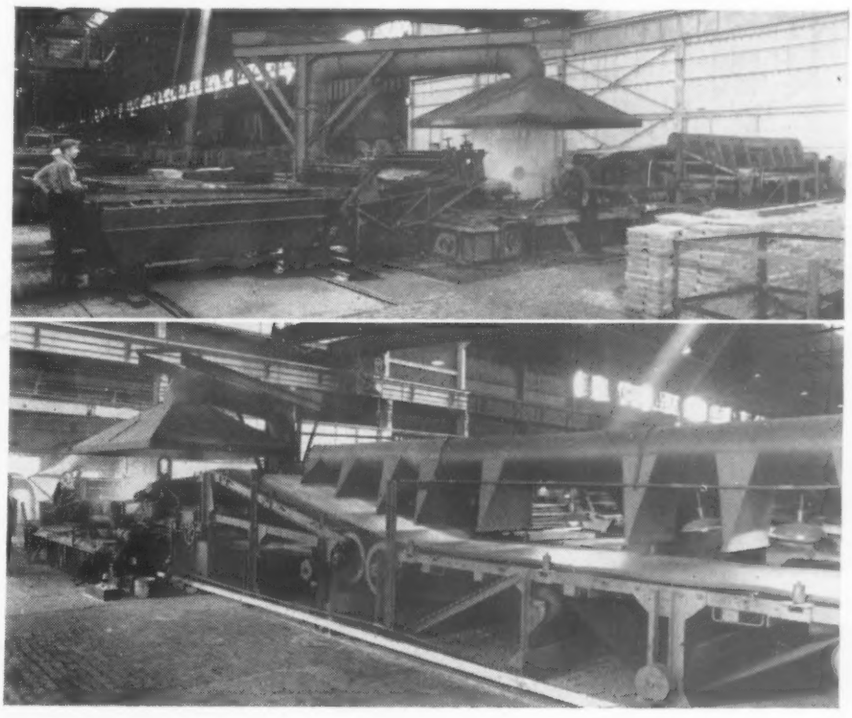
■ A NEW, straight line, double bottom roll, galvanizing unit recently installed in a large midwestern steel plant by Aetna-Standard Engineering Co., Youngstown, O., brings the number of large, double bottom roll units in successful operation up to seven.

This new installation has many mechanical improvements which aid operation. The line consists mainly of an improved acid dip feeder, a 66-inch double bottom roll rig in a 96 x 136 x 60-inch kettle, a completely synchronized single motor drive, a large mesh wire fence conveyor with magnet rolls for spangle control, a small mesh fence conveyor, air cooling piping, a 4½ x 72-inch roller leveller, a water wash and cooling tank with wringer rolls, a hot air dryer, and a 3¾ x 72-inch roller leveller. The line was furnished complete with a sulphur blower system, fume exhaust system and an oil fired setting.

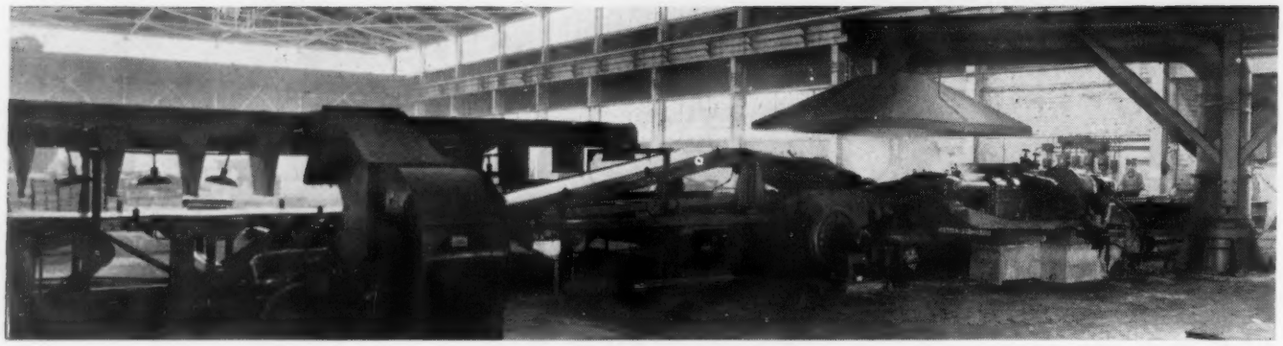
The machine is driven by a motor capable of 400 to 1600 revolutions per minute. Machine has two speed ranges with a gear shift: A speed of 10 to 40 feet per minute for heavy gages and from 40 to 160 feet per minute for lighter gages. This permits coating all gages from 8 to 30.

Most of the mechanical improvements have been made to attain smoother operation under higher speeds. Other changes provide for more room for convenience in operation and in drossing. The drives all along the line have been made huskier to assure trouble-free operation and minimum maintenance and repair.

One of the difficulties of high speed galvanizing is the necessity of a greater amount of heat. This new unit is provided with a well insulated setting and built in accordance with latest furnace designs. A combustion chamber across front end of the kettle is equipped with two high capacity, oil burners. Side dampers as well as a stack damper provide for flue gas control. Automatic temperature controls and a proportioning valve maintain a uniform temperature of the bath regardless of operating conditions. This and two other similar settings indicate the correctness of design,



Top view shows feed table end of galvanizing unit. Galvanizing pot is under hood at center. Washer and wringer rolls which precede actual galvanizing are at end of feed table. Lower view shows sheets coming out of the pot onto the drying table



Rear view of unit showing galvanizing pot drives. A single motor operates all rolls synchronously through speed reducers which permit speed changes to accommodate varying roll diameters

absence of hot spots, and low fuel consumption.

Increase in black surface radiation due to a larger kettle has been offset by higher production and more efficient operation to such an extent that fuel costs per ton actually are lower than on many smaller machines.

Galvanizers have long known that speed has a definite relation to good coating; in other words, the best coating will be obtained when the sheet is removed from the bath as quickly as possible after it has reached a coating temperature. This is true since as soon as the flux has left the surface of the sheet a zinc-iron alloy layer begins forming and the longer the sheet is left in the bath the heavier is this layer.

Normally a galvanized sheet has three layers: Base metal, zinc iron alloy (usually Fe Zn_7) and the pure zinc outer coating. Sometimes a thin layer of Fe Zn_3 is found between the layer of Fe Zn_7 and the base metal. However, the layer of Fe Zn_7 is quite brittle and has a great effect on adherence. Any brittle substance becomes more flexible as it is made thinner. Thus the lighter the zinc-iron alloy layer, the more deformation the coated sheet will stand without flaking or cracking.

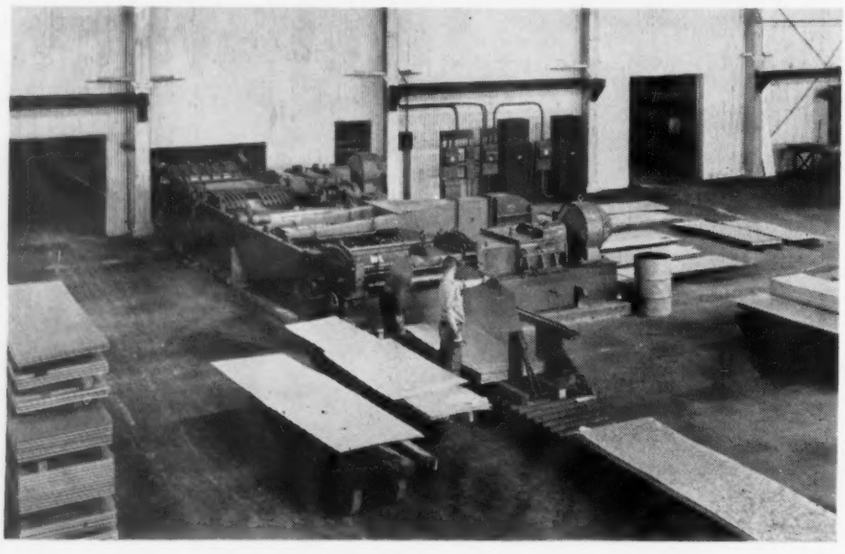
Although this characteristic of galvanized sheets has long been realized, the increase in speed to shorten the time of alloy formation presented two major difficulties. If the speed was increased on light gage sheets, the flux would not clear off the sheet and would result in flux stains, poor coating and dirty bottom rolls. Heavy gages could not be run faster as they would not be uniformly heated and would be coated unevenly.

A logical solution to these problems would be to increase the distance of travel in the entering end. This, however, is impossible as the distance between the flux rolls and the bottom rolls is governed by the minimum length of sheets to be run. As this is usually 72 inches, the distance between rolls must be approximately 67 inches to assure continuous travel. Even if longer sheets were always run, the distance light gage material could be pushed through the bath without buckling is limited.

The real solution then came in placing a second pair of bottom rolls approximately 30 inches from the first pair and lengthening the entire unit so the distance from the second pair to the exit rolls remained the same as it had been previously, this latter dimension having been fixed by many years of galvanizing experience. Thus an increase in distance from the flux line to the last pair of bottom rolls of approximately 50 per cent was achieved without upsetting any other operating conditions.

It was assumed that this arrangement would operate successfully even though the flux carried into the first pair of bottom rolls. This assumption has proven true as it has been found that as long as the second pair of bottom rolls remained clean, good coating resulted.

Finishing end of galvanizing unit comes out on loading dock. Two roller levelers are used, one before and one after the water wash and hot air dry



Heavier Gages Benefit

As the time for heating varies according to gage and the time required for the flux to leave the sheet is constant, the greatest benefits from this new arrangement are found in the heavier gages. However, common practice in seven different galvanizing shops with these units indicates increases in speeds can be expected as follows: On extremely heavy gages, 50 to 100 per cent; on medium gages, 20 to 40 per cent; and on light gages, 10 to 15 per cent. With all these increases of speeds, a better coating has resulted with a diminished alloy layer indicated, especially on the heavier gages where the speed increase is the greatest.

These higher speeds brought out other operating problems. Grooving of exit rolls and the bath level had to be adjusted to prevent heavy coatings. The flux around the exit rolls must be kept at the proper consistency so it will not be carried around the rolls. These problems were anticipated and in most cases overcome.

It has been suggested with two pairs of bottom rolls in the machine,

(*Please turn to Page* 86)

QUIGLEY SERVICE Renders Valuable Help in Emergency

Helps Put Gas Plant in Operation When Flood Deluges Main Works and Hurricane Wrecks Gas Holder.

The September 21st hurricane, flood and tidal wave left a wake of destruction in and around Providence, R. I. No electric power. City isolated. Business suspended. Property damage untold millions.

Providence Gas Works' entire 40 acres submerged. Electric generators and motors flooded. Gas holder destroyed. No electricity to run coke ovens. Company fell back on carburetted water gas plant, run only intermittently. Fire clay linings and brick bond of water gas sets had spalled considerably,

Quigley Serviceman at Work.

Plant of Providence Gas Works as Raging Flood Waters Deluged Yards and Equipment.

Photo by Chas. S. Williams, Jr.

and concern was felt as to how long they would last. Sets had to be patched due to clinkers being barred off to keep them in working condition.

Gas company called Frank M. Leach, Quigley Co's., Pawtucket Manager. Leach went to Quigley warehouse. Got enough material to repair the sets, and, with the QUIGLEY REFRACTORY GUN which Providence Gas Co. has, surfaced these linings with material which prevented further erosion.

All of this patching was done without a shutdown, a task that would have been nearly impossible to accomplish in any other manner.

Only after helping with all this work, with the light of two candles, had Leach time to write his report. (See photo above.) Many dwellings within a block of his home were destroyed.

The Quigley organization has many experienced Service Engineers ready to give practical advice and assistance to industries, that plants may operate efficiently at minimum maintenance cost.

East Providence Gas Holder Destroyed by Hurricane September 21, 1938

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QUIGLEY COMPANY, INC.

56 W. 45th Street, New York, N. Y.

Makers of HYTEMPITE *"The World's Standard High Temperature Cement"* • FIRE BRICK • INSULBRIX • INSULAG • INSULBLOX • INSULCRETE Q-CHROMASTIC • HEARTH-CRETE • CAST-REFRACT • Q-SEAL • TRIPLE-A PROTECTIVE COATINGS • Q-CHROME • DAMIT ACID-PROOF CEMENTS • *ANNITE*

Distributors with Stocks and Service in Important Industrial Centers Throughout the United States, Canada, and in 32 Other Countries.
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NEW METAL PRODUCTS

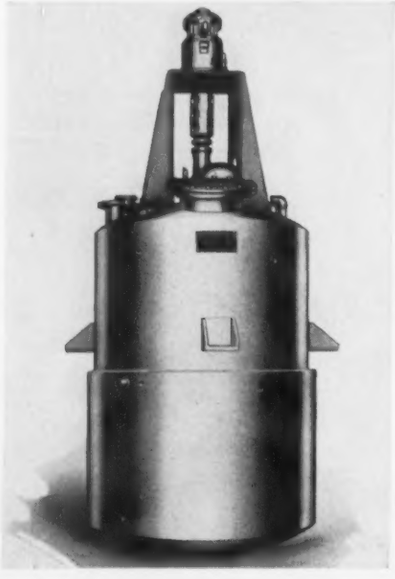
■ Application of the principle of rotation to record systems has been accomplished by Diebold Safe & Lock Co., Canton, O., in the de-

sign of its new Cardineer units, which revolve in a vertical plane and accommodate from 1000 to 7000 posting or reference records each.

These units present every record at one common position—the top of the wheel—for easy reach and visibility. Files are furnished in steel cabinets mounted on swivel casters. Their light weight makes for easy portability.

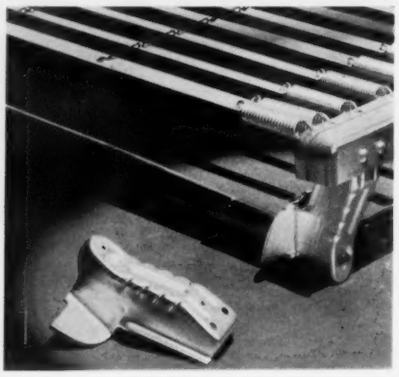
■ Developed for use in the manufacture of textile oil emulsion, a line of stainless steel kettles has just been introduced by Patterson Foundry & Machine Co., East Liverpool, O. All internal parts are ground and polished to further insure cleanliness in operation.

Kettles are furnished in a variety of sizes; the model illustrated is 5 feet in diameter by 6 feet 6 inches deep and is built for 50 pounds in-



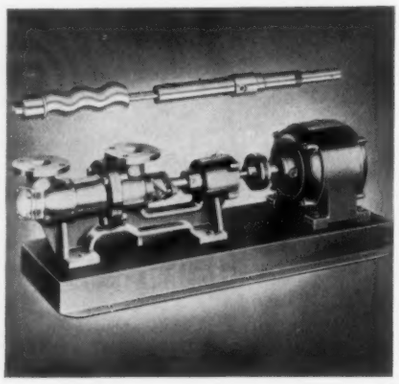
ternal working pressure and 65 pounds jacket pressure. It is equipped with motor drive and improved stirring mechanism. These machines are supplied either with or without vent condensers.

■ Intended to replace the malleable iron casting previously used at the four corners of link and institu-



tional type bedsprings, a stamped sheet steel riser bracket has been developed by Wrought Washer Mfg. Co., Milwaukee. This new unit is claimed to be stronger, lighter, more attractive and more economical than the casting.

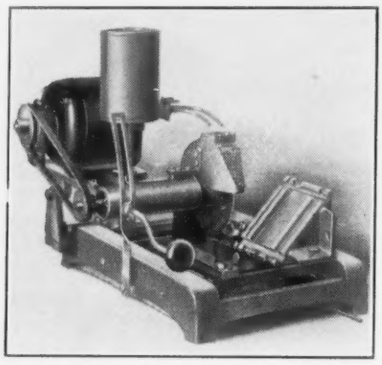
■ Ability to handle any liquid which will flow through a pipe is claimed for this Moyno pumping



device patented by Robbins & Myers Inc., Springfield, O. Pumping elements consist of a rotor in the form of a single threaded double pitch helix which meshes with, and turns in, a stator which has the internal form of a double threaded single pitch helix.

Parts which come in contact with fluid are made of materials highly resistant to corrosion. Where acids or chemicals are to be handled, the rotor, rotor shaft and connecting rods are all made of 18-8 stainless chromium steel, hard-chromium-plated. For certain special conditions, monel metal is used.

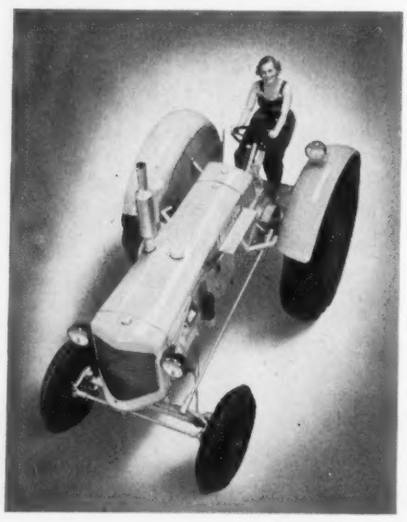
■ Designed for cutting all types and sizes of tile without chipping or cracking glaze, a new portable ma-



chine has been developed by Felker Bros. Mfg. Co., Marshfield, Wis.

Width of cut is only 3/64-inch, made by a blade which cannot break or fly to pieces. Machine's table is equipped with three fences, allowing cutting of both straight and angular faces and bevel plates. In addition to regular tile cutting, this machine is suitable for cutting glass, nonlaminated plastics, porcelains, refractories, semiprecious stones and vitrified products.

■ Constructed and finished in keeping with modern trends toward streamlining, this Standard "U" tractor, most recent addition to the line of Minneapolis-Moline Power Implement Co., Minneapolis, features improved appearance without the sacrifice of strength, power or ruggedness. The power shaft, 23 different gears and pinions and the more highly stressed bolts through out the tractor are made of heat-treated nickel alloy steels.



...the Simple Answer to these TOUGH Questions

MANUFACTURERS are discovering that American Quality Cold Rolled Strip Steel is the best answer to both of these questions. This product fabricates more easily and at less cost than more expensive metals. And merchandise fabricated from this versatile material has a smart appearance that appeals to the consumer eye.

Parts that are durable, accurate in size, light in weight, and attractive in appearance can be fabricated at a savings from American Quality Cold Rolled Strip Steel. Our engineering and metallurgical departments are ready to show you how the wide range of edges, tempers, finishes and widths of our Cold Rolled Strip Steel can save you money whether you make complete products or parts. Put your problem up to them. They can assist you in determining the proper type of Cold Rolled Strip Steel to meet your needs.

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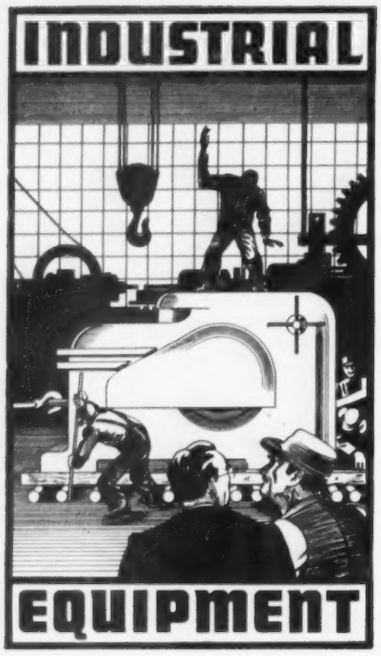
UNITED STATES STEEL



Increases Capacity of Spring Coiling Machine

■ Sleeper & Hartley Inc., Worcester, Mass., has introduced a universal spring coiling machine that will coil and cut all kinds of compression and extension springs in sizes up to wire length of 48 inches per spring, using music or oil tempered spring wire up to 0.08-inch diameter.

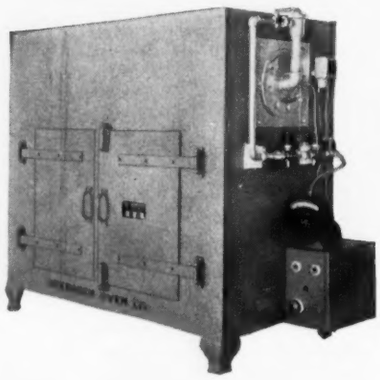
This coiler has a recessed cabinet covered by a hinged door; it is from this accessible point that control of pitch and diameter is regulated. In setting up for a special spring, both pitch and diameter cams may be shaped, timed and affixed to the cam hub, which, as an entire single unit, can be removed from the shaft. Other controls include; individual pressure for each pair of feed rolls; individual adjustment for cutter alignment; micrometer adjustment of compound blocks; pitch-stop conveniently located and quickly adjustable.

Machine has a one-piece housing, and ball bearings are used on all rotating shafts. Multi-pawl ratchet increases accuracy of the feed. Variable speed transmission for production range is available, if desired. Tooling is interchangeable with previous models, and special tooling may be applied for use of square or rectangular wire.

Gas Fired Oven Employs Horizontal Air Travel

■ Despatch Oven Co., 622 Ninth street, S. E., Minneapolis, has developed a gas fired oven, designated as type CF, for glass annealing, tempering and drawing in tool rooms or in the production line.

Horizontal air travel is used instead of the customary vertical air flow, permitting heavier loading of parts and more uniform results. Heating system is outside the working chamber, and a fan is used to push heated air through the load. Air is introduced into the oven



through a series of adjustable baffles and travels crosswise to recirculating ducts. Operating temperatures ranging from 225 to 950 degrees Fahr. are said to be obtained in a comparatively short time by means of the gas heating system. Heavy insulation and compact arrangement keep heat losses low.

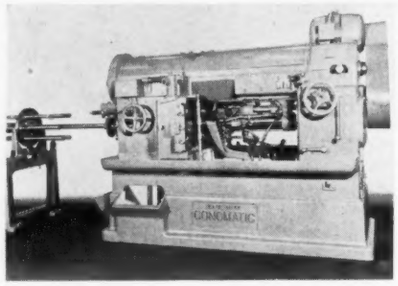
Oven is built in all sizes from 19 x 19 x 19-inch units to truck-loaded sizes. Prices range from $240 upward for complete oven and automatic temperature control system.

Operating Refinements Improve Automatic Unit

■ Cone Automatic Machine Co., Windsor, Vt., has announced several improvements to its line of Conomatic 6-spindle machines for high speed drilling, reaming, threading, tapping, roll-turning, knee-turning, roll-supporting and forming.

Open end gearing now is available, reducing time required to place an attachment into operation. High and low speed cam action may be disconnected by the operator when checking tools. Power feed engagement is instantaneous and operates by a touch of the lever.

Two formers and a cutoff tool are



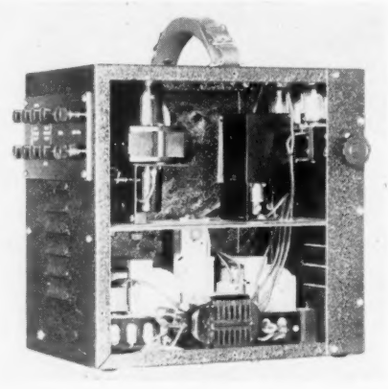
held in the front slide, and three forming tools are operated in the rear slide. Six end working positions are provided by the cylindrical turret, and two independent end positions are supplied by the semi-turret. Two more independent end stations are provided by auxiliary spindle attachments. Universal auxiliary cross slides are attached easily to top-bed for operation in the fifth and sixth positions.

Machine is 56 inches wide, 122 inches long and 67 inches high and weighs 16,500 pounds. It is driven by a 15-horsepower motor which operates at 1200 revolutions per minute.

Galvanometer Operates Controlling Circuits

■ General Electric Co., Schenectady, N. Y., has developed for permanent or temporary installations in factories or laboratories a portable, photoelectric, contact-making galvanometer, designed to operate controlling circuits or to sound alarms.

Instrument is housed in a case



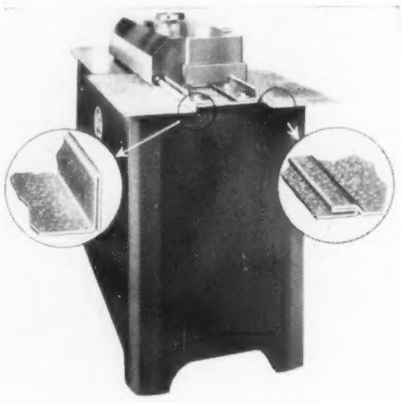
measuring 7 x 7 x 10 inches and operates in the following manner: Galvanometer mirror reflects a light beam upon a scale, where two ad-

justable phototubes intercept the beam for any desired preset values indicated by pointers. Each phototube actuates an electronic relay which is equipped with a single-pole, double-throw contact.

Most general application of this unit lies in temperature measurement and control. A sensitivity as high as 2.2 microvolts per division is obtainable. Instrument can be used with potentiometers of the precision or thermocouple types for more sensitive measurements. Illustration shows galvanometer with rear cover removed, indicating arrangement of internal parts.

Unit Makes Sheet Metal Assembly More Uniform

■ Ward Machinery Co., 564 West Washington boulevard, Chicago, has announced a new model Almar universal lock forming machine, adaptable for Pittsburgh lock forming on one side, with seven sets of spindles



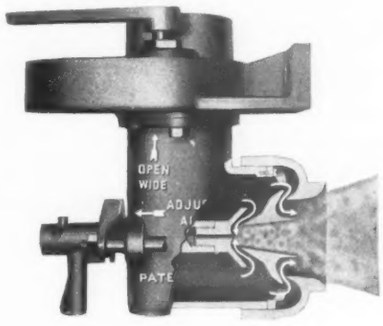
on the other side which will accommodate other types of rolls for sheet metal fabrication such as standing seam, single edging and drive cleats.

Capacity range is 18-gage and lighter. Machine is equipped with a 2-horsepower motor and a new type reversing switch. It weighs 1200 pounds and has a speed of 35 to 40 feet per minute. Large calibrated handwheel mounted on top the machine handles a full range of specified gages of material, and small calibrated wheel at right hand side of machine governs opening in the lock as to thickness of material that enters.

Oil Burners Feature Simple Construction

■ Johnston Mfg. Co., 2825 East Hennepin avenue, Minneapolis, has supplemented its line of reverse blast oil burners with a new No. 500 series designed primarily for forge furnace application. Simplicity of construction, accessibility of interior parts and re-assembly without readjustment are features of this equipment.

Complete burner body assembly may be taken from the furnace by disconnecting a union in the oil line



and removing two cap screws. Blast gate is mounted directly on the burner attachment plate and closes off air supply when burner body is removed. This eliminates necessity of disturbing blast piping or blast air supply. Two nuts hold the cap on the burner body. Removal of this cap exposes oil stem head and atomizer nozzle for inspection and cleaning.

Burners are designed to operate on blast air at from 10 to 16 ounces pressure and on any grade of fuel oil. Capacities range from ¾ to 11.5 gallons per hour.

Respirator Features Low Resistance to Breathing

■ Willson Products Inc., 273 Thorn street, Reading, Pa., has announced a new low-resistance chemical cartridge respirator especially designed for plating operations, brazing, paint spraying, etc., and for use in light concentrations of organic vapors and acid gases.

Available in either 190 or 100

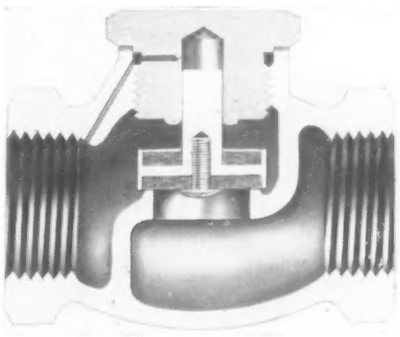
cubic centimeter content, the respirator has several distinctive features. It employes two inexpensive replaceable cartridges which results in a very low breathing resistance. The use of extra large cartridges affords an unusually large degree of protection.

A new form-fitting rubber face piece, conforming to the face, permits better visibility. Spectacles or goggles may be worn with absolute comfort and the entire respirator is so compact that it may be worn underneath a welder's helmet without interference. Three separate chemical fills are available depending upon the use to which the respirator is to be put.

Construction of Valve Eliminates Chattering

■ C. A. Norgren Co., Denver, Colo., has placed on the market a check valve which eliminates irritating noise and destruction due to valve hammer in air lines.

The moving valve, made of bronze



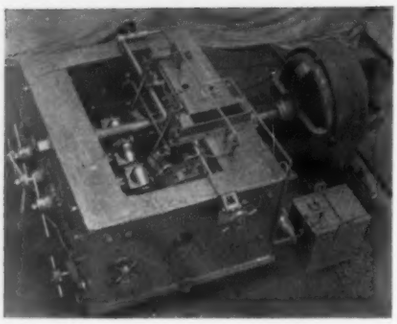
and brass bar stock, is so constructed as to be held in suspension by suction created above valve stem by flow of the air itself past syphon hole in the valve body.

When compressor is operating under normal conditions, check remains open and air pasess freely and quietly into receiver. When compressor stops, vacuum above the stem is broken and valve returns to its seat. Such action naturally eliminates valve hammer common to all ordinary valves. Valve is easily serviced by simple repiacement of inexpensive discs.

Sizes and Straightens Bars to Close Limits

■ Sutton Engineering Co., Park building, Pittsburgh, has placed on the market a machine which will straighten, size and finish hot-rolled, pickled and limed commercial bars to within 0.002-inch limits at rate of 200 to 300 feet per minute, according to the manufacturer. It will size to the same accuracy bars which have not been pickled and limed, just as they come from the mill.

In addition to sizing, this machine



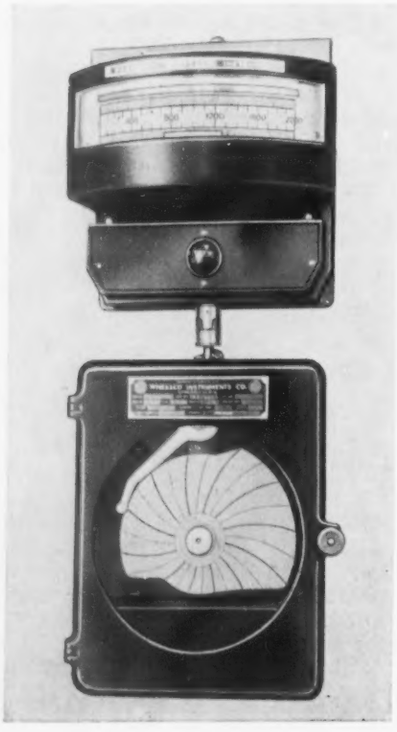
was designed for straightening high tensile, oil-quenched round bars in diameters from ½-inch to 1½-inches.

Machine has Timken bearings throughout, and has only four grease lubricating points, balance of lubrication being handled by a pump operated by a separate motor. Rolls are of 90 shore hardness. Angle of all rolls is adjustable so that uniform results may be obtained on all sizes. Sizing can be accomplished on bars from ½-inch to 2 inches in diameter.

Controls Temperature Programs Automatically

■ Wheelco Instruments Co., 1933 South Halstead street, Chicago, has devised a variable temperature control unit which makes it possible to carry out automatically a program of specified temperatures.

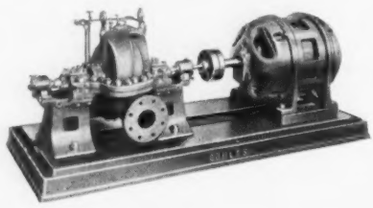
Program control consists of the program unit and a controller mounted integrally. An idler arm which rides on the edge of a contoured disk of the program unit is attached to the temperature control setting pointer of the Capacitrol. Operating on the "radio principle" the controller regulates furnace temperature to any point set on the scale by the setting pointer. The contoured disk can be cut to any time cycle desired with any variation of temperature control. Disk may be removed and replaced by other contoured disks to suit any required heating program.



Pump Casings Furnished In Variety of Metals

■ Goulds Pumps Inc., Seneca Falls, N. Y., has announced a line of Fig. 3390 centrifugal two-stage pumps with opposed, hydraulically balanced impellers for heads up to 1000 feet.

Cast iron casing is horizontally split and is provided with air cocks and openings for priming and draining. Centerline support allows for metal expansion when handling hot liquids. Casing is fitted with renewable bronze wearing rings. Impellers are acid resisting bronze and are enclosed, single suction type, cast in one piece. Shaft is heat-treated alloy steel, and shaft sleeves are bronze, secured to shaft with key, set screw and nut accessible from exterior of stuffing box. Extra deep stuffing box has a bronze seal ring to which can be piped liquid or lubricant from outside source.



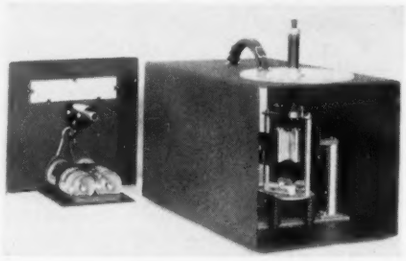
Regularly furnished bronze fitted as above, these pumps can be furnished also in all iron, all bronze, cast steel, stainless steel and other special metals.

Specially Compensated Voltmeters Are Accurate

■ General Electric Co., Schenectady, N. Y., has added to its line of standard voltmeters two specially compensated type AP-9 instruments, with which temperature errors are reduced over a wide range of conditions.

Using the same terminal arrangement as standard instruments, these units differ in ohms-per-volt sensitivity, temperature coefficient and accuracy. They are listed in ratings of 150 and 150/300 volts and are expected to find their major applications in voltage-survey work.

As a result of the leveling-off of temperature variations, these instruments, when used on a 150-volt tap, are accurate to within 0.5 per cent throughout the 75 to 150-volt portions of their scales and maintain accuracy of 0.75 per cent throughout the remainder of their scales.



Develop Lighting Units For Hazardous Locations

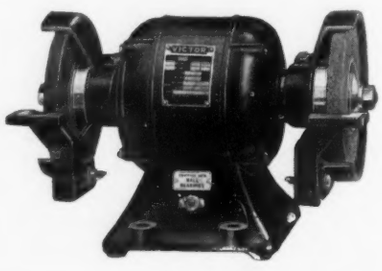
■ Benjamin Electric Mfg. Co., Des Plaines, Ill., has announced a series of angle bracket type explosion-proof lighting fixtures suitable for wall mounting in locations where it is not possible to mount lighting units overhead.

These fixtures are listed by Underwriters' Laboratories as suitable for hazardous locations in which flammable, volatile liquids or other substances are manufactured or stored. These include ethyl ether, gasoline, petroleum, naphtha, alcohol and lacquer solvent vapors.

Brackets and lighting fixtures are designed with ample strength in the cast hood and glass globe to withstand tremendous pressure of internal explosion.

Adds New Bench Grinder

■ Stanley Electric Tool division, Stanley Works, New Britain, Conn., has introduced a new bench grinder,



known as the No. 66 Victor, suitable for general grinding, sharpening tools, buffing, polishing and wire brush work.

Finished in gray enamel, this unit has a ¼-horsepower motor. It is equipped with sturdy wheel guards, tool rests, toggle switch, rubber feet and two 6-inch grinding wheels, one coarse and one fine. Grinder sells for $18.50.

ADVERTISING PAGES REMOVED

Food Machine Production

(*Concluded from Page* 45)

Skeleton steel goes on through the machine and punchings as well as rotor and stator laminations fall through the bed of the press.

At the assembly department all machines are run for a 2 to 2½-hour period before final inspection. Each coffee mill is tested with coffee and each mixer is run approximately four hours under load. After assembly and testing, machines pass to the finishing department and on to shipping floor. The shipping platform extends 600 feet along the railroad siding adjoining this department.

Crated machines are stored and handled in the shipping department on overhead monorail system which completely covers this portion of the plant. Equipped with electric hoists it facilitates shipping operations.

♦

Power Circuits

(*Concluded from Page* 55)

in the hot mill buildings, two in the pickling building and two more in the cold mill building. Fig. 10 is a typical back-of-board view of wiring and equipment found in these control houses. Fig. 3 shows wiring conduit entering through the floor of the control house and Fig. 10 shows the wiring emerging from the tops of these conduit and connected to terminals back-of-board.

A peak force of nearly 500 men was employed in installing and wiring electrical equipment in this plant. More than 143 miles of conduit and 227 miles of wire and cable are in use here.

Cold-mill motor room employs one 6000-kilowatt motor generator set and also a 5000-kilowatt unit. These motor generator sets furnish 600 volt, direct current power for the following: The 3-stand tandem mill which employs one 1500 horsepower motor on the first stand and a 2500-horsepower motor on each of the succeeding two stands; also the 98-inch skin pass mill which employs a 500-horsepower, direct current motor and other equipment. These motors are connected to the 600-volt generators in the motor room through copper bus bars. This was permissible and less costly than the heavier construction necessary in the hot mill because of the much less concentration of power on these buses.

Fig. 9 shows a back-of-board view of aluminum channel buses, disconnect switches and miscellaneous control equipment mounted in the basement below the cold-mill motor room. Individual red and green signal lights at each of the hand operated disconnect switches shown here indicate whether a load is being drawn through the switch. This aids the operator by automatically indicating loaded switches so a switch will not be opened accidentally under load which of course might result in a dangerous arc being formed.

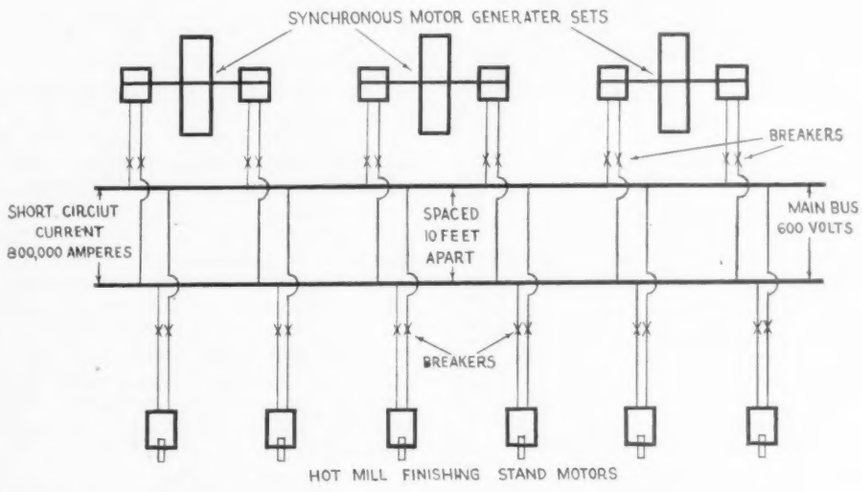
All cable and wiring throughout the entire plant is in steel conduit anchored in concrete wherever possible. All conduit openings are sealed with rags and cemented to prevent entrance of moisture.

Switching and control equipment for the 98 inch, 3 stand continuous cold reduction mill is located in a basement gallery almost directly underneath this mill. Of course operating controls for the continuous cold mill are mounted on each of the three individual stands as well as uncoiler and recoiler operating control.

Also auxiliary control and switchboard equipment for side trimming and flying shear lines, up-cut shear line, the single stand 98-inch combination sheet and strip mill, the single stand 98-inch skin pass mill and a slitting line are all located in basement gallery adjoining.

As an aid to safety where 440-volt auxiliary equipment is used in various locations around the plant 110 or 220-volt control circuits using step-down transformers are employed.

Fig. 11—Layout and wiring diagram for 600-volt bus, synchronous motor-generator sets and hot-mill finishing stand motors



Extensive Wiring Unnoticeable

Perhaps the most outstanding thing concerning wiring of this huge mill is its unobtrusiveness as about the only place one is conscious of the presence of considerable wiring is in the control houses centered at 10 points, shown on diagram Fig. 1, throughout the mill. Even here there is no overlapping or doubling back and forth of circuits.

Safety grounding is provided by a network of 500,000-circular-mill copper bars. This network extends around the outside of the hot mill building and laterals are connected crosswise of building at intervals of 200 feet or less. All conduit and structural steel supporting the conduit are connected to this ground circuit.

When installing conduit, possible expansion requirements were given adequate consideration and additional conduit placed at corners and where installation of future conduit might require partial dismantling of walls or foundations.

♦

Dust Control Equipment Group Offers Services

■Dust Control Equipment association is offering the services of its engineering committee to all manufacturers of industrial machinery in connection with which a dust problem arises. A closer working arrangement, it is felt, will produce uniformity in different directions based on observance of sound engineering practices and definite experience. Through this means, the inconsistency in design of hoods and other auxiliary equipment can be eliminated.

This was one of several important decisions made by the association at a recent meeting in Cleveland. The group has been working closely with the hygiene codes committee of the American Foundrymen's association in completing codes for various services and assisted in preparing the latter's handbook on "Fundamentals of Design, Construction, Operation and Maintenance of Exhaust Systems." This co-operation will be continued in connection with the "Metals Cleaning" and other codes. The association also will

continue its co-operation with the New York state labor department and American Standards association in connection with safety codes for exhaust systems.

The association's decision to offer its service to industry originated in the program for developing standards of dust control practice and in bringing about closer co-operation between users and makers of dust control equipment. Certain work undertaken in this direction has shown the definite possibilities of improved service to users and potential users of the equipment. Manufacturers interested in the question are invited to communicate with Tuscany, Turner & Associates, Penton building, Cleveland, who serve the association as executive secretary.

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Text and Reference On Steel Construction

■ *Steel Construction*, by Henry Jackson Burt, revised by C. H. Sandberg; cloth, 438 pages, 5½ x 8¼; published by American Technical Society, Chicago; supplied by STEEL, Cleveland, for $3.50; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W.1.

A text and reference book on the design of steel framework for buildings, this edition has been revised and enlarged to bring it up to the present in steel construction practice. The revision includes up-to-date specifications and data and numerous photographs and drawings. Arrangement into chapter form makes the volume more convenient for use. Additional chapters, notably those on welding and industrial buildings, have been included to cover present steel building design more completely. Complete sets of plans for a powerhouse and for a four-story school building were included in the chapters on industrial and multistory buildings.

The volume is intended to present the facts and formulas needed for designing the structural steel framework for buildings. Since these alone would be of little use they are accompanied by explanations of the underlying principles, understanding of which is essential to intelligent use of the formulas.

As a textbook for students the important feature is the theory on which are based the formulas and their applications. For use as a reference by designers the book brings together the necessary data, easily accessible, for complete design of structural steelwork for business buildings, with illustrations to guide in solution of problems encountered in practice.

A wealth of illustrations, drawings and tables is included and the appendix contains specifications and codes applicable to construction.

Trade Standards Issued For Air Compressors

■ *Trade Standards, Compressed Air Industry*, fifth edition; 112 pages, 8½ x 11 inches, wire binding; published by Compressed Air Institute, New York; supplied by STEEL, Cleveland, for $1; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W. 1.

Double the size of the preceding edition, it includes such new material as sections on rotary compressors and vacuum pumps, centrifugal compressors and blowers, compressor accessories, rock drills and pneumatic tools. Charts and tables have been added. Material previously published on reciprocating compressors and vacuum pumps (stationary type) and portable compressors has been revised. A description is given of the method of testing displacement compressors, blowers and vacuum pumps, conforming to the revised A.S.M.E. code now under preparation.

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MATERIALS HANDLING EQUIPMENT

For Manual or Motor Operation

• A transfer bridge crane with hand pushed carrier and chain hoist is one of the many Tramrail units serving this modern steel warehouse.

• These type units completely motorized are also standard equipment.

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WICKLIFFE, OHIO

Or consult your phone directory under Cleveland Tramrail.

Auto Parts Plant

(*Continued from Page* 60)

with a system of clean, filtered air.

A central paint storage and paint mixing room is located some 300 feet from the spray booths. Here colors are mixed and maintained under unvarying conditions. From here, the lacquer is piped to each of the spray booths by means of a recirculating delivery system.

Control ventilator parts and assemblies are fabricated in a fourth major manufacturing department which also supplies complete ventipane assemblies, rims, reflectors and other dome light elements, division channels, windshield division moldings, interior escutcheons, seat adjuster escutcheons and switch plates.

Manufacture of the various items is segregated in certain floor areas to permit straight-line production methods. Here too, slides, storage hoppers, monorail and belt conveyors relieve employes of all manual materials handling operations. A feature of this department is a 120-foot long, automatic, nickel plating machine to which all bright-plated parts are routed by overhead monorail. Chromium plate is applied by a 56-foot, automatic, chromium plating machine.

The department includes a complete system of overhead conveyor lines, a battery of 10 buffing lathes and 8 specially constructed polishing machines. An automatic, straight line, polishing machine has 6 counterbalanced heads which seek out every portion of the division channel, taking in even the corners and crevices usually considered strictly hand operations.

A battery of 13 tumbling barrels removes sharp corners on parts. Eight double-burnishing units put on the required finish. Small stainless steel, nickel or chromium plated parts are handled in this manner. Small parts then are washed and dried in a battery of three, continuous, automatic units.

Fittings Die Cast

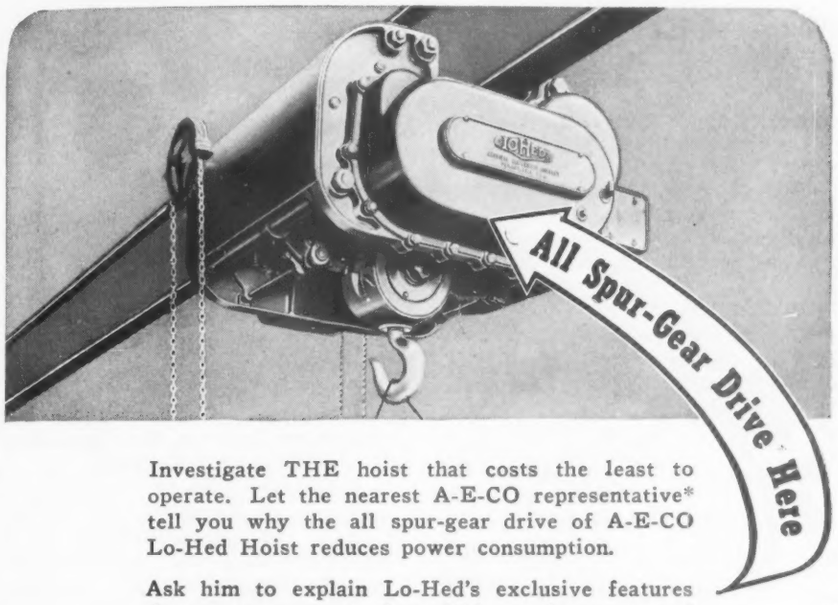
A die casting department houses complete facilities for producing all interior and exterior fittings required. A metal alloy section at head of production lines contains equipment for preparation of zinc alloy charges for the die casting machines and adequate accommodation for zinc slab storage. This department produces inner and outer door handles, deck lid and trunk handles, trunk hinges, crank handles for window regulators and ventilators, and medallions of various sorts. Some 450 tons of zinc is maintained constantly in two large bins served by a craneway.

Four large melting furnaces are used. The hardener added to the molten metal is prepared in two separate crucibles. Resulting alloy is poured into ladles traveling on an overhead monorail which feeds the die casting machines. Thirteen of these have a die size rating of 18 x 18 inches. Six smaller machines serve small parts production. Both batteries are traversed by belt conveyors on which the work is discharged from the machines and transported to the inspection line.

Waste acid from plating tanks is neutralized before being permitted to pass into the city sewers to protect the water supply, prevent stream pollution and subsequent loss of marine life and to eliminate possibility of disrupting the biological control exercised over the city's sewage disposal system.

Some 1,500,000 gallons of plating and washing solution is discharged daily. Also waste accumulating over the week-end after cleaning the tanks has to be handled. A third problem was the disposal of actual plating solutions when they lose their usefulness, occurring perhaps two or three times a year.

(*Please turn to Page* 102)



Investigate THE hoist that costs the least to operate. Let the nearest A-E-CO representative* tell you why the all spur-gear drive of A-E-CO Lo-Hed Hoist reduces power consumption.

Ask him to explain Lo-Hed's exclusive features that mean constant, dependable performance and lower maintenance cost.

Let him show you Lo-Hed's uses in scores of industries.

Find out *why* Lo-Hed is the logical hoist for EVERY purpose and why it is the *only* hoist for low headroom conditions. A-E-CO Lo-Hed Hoists are built in many standard models, from ¼ to 12 ton capacities.

Lowers Cost of Operation Here

*Classified phone directories list the local A-E-CO representative in principal cities. Call him in... or write us for the new hoist catalog.

Other A-E-CO Products: Taylor Stoker Units Morlae Deck Auxiliaries Hele-Shaw Field Power.

A-E-CO Lo-Hed HOISTS

AMERICAN ENGINEERING COMPANY

2484 ARAMINGO AVENUE, PHILADELPHIA, PA.

Fast Galvanizing

(*Concluded from Page 74*)

the amount of dross stirred up and thrown against the sheet is double that of the single bottom roll machine. There is no proof of this as no dross spots have been noticed. There is, however, ample proof that more ductile coatings are produced with the higher speeds possible on the double bottom roll rigs.

All modern galvanizing units installed in the past few years have been equipped with kettles at least 60 inches deep which allows plenty of room for the dross to settle to an undisturbed level.

Examination of the zinc layer in the coating which must be of the same composition as the bath rarely shows evidence of zinc-iron crystals. The zinc-iron alloy on a sheet is not taken from the bath but is formed on the sheet itself. An examination of the dross produced over a long period of time shows much more iron present than could be dissolved out of the kettle and rig. Therefore it must come from the iron salts left on the sheet after pickling and from the sheet.

Thus to produce galvanized sheets with a lighter alloy layer, it is necessary to have sheets more free from pickle salts and to remove the sheets from the coating bath more rapidly, easily done by large double bottom roll machines.

Eliminates Chatter

The new, fully synchronized, single motor, galvanizing machine drive has relieved the galvanizer of many headaches. Rugged construction and modern design eliminates chatter at all speeds. Weight of this new drive is approximately 10 tons. It is completely equipped with antifriction bearings, fully enclosed gear and worm drives, stepless transmissions for accurate synchronization of roll speeds and remote control clutches.

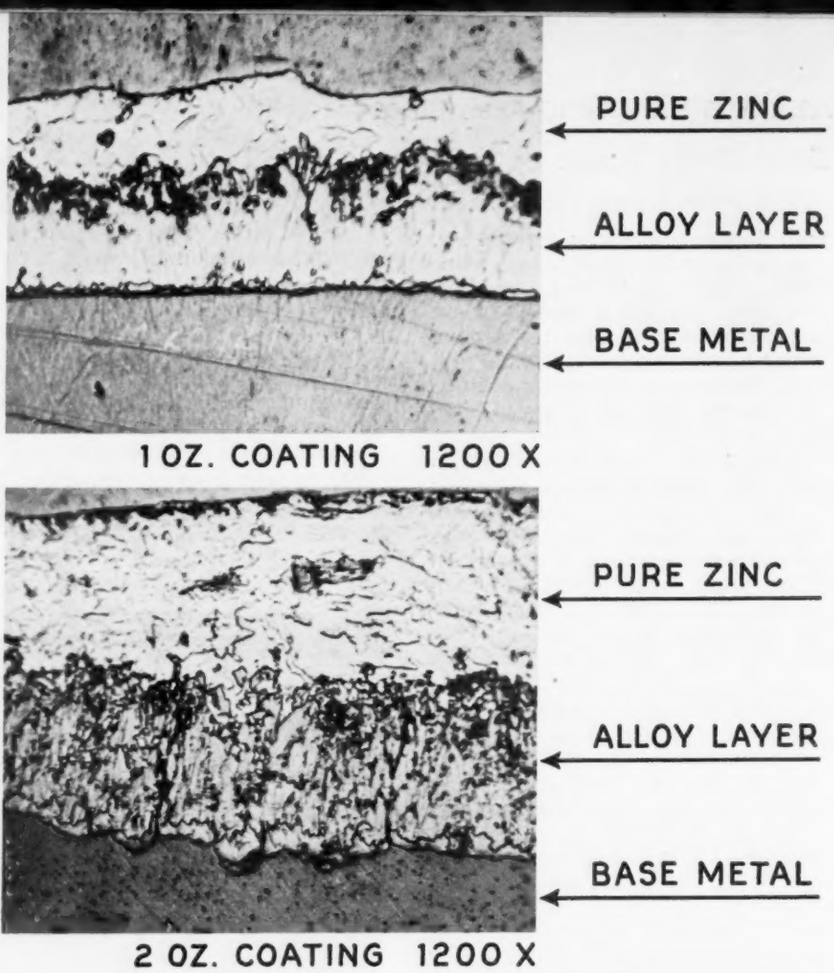
Stepless transmissions permit the galvanizer to correct instantly speed differences between flux rolls and bottom rolls and between bottom rolls and exit rolls.

Due to a single driving motor, speed of the entire drive is raised or lowered as a unit. Rolls may be turned down more than 1 inch on the diameter and still be in the range of correction.

One reason for adjusting speed of flux and exit rolls comes from the alloy buildup of the bottom rolls. This amounts to as much as ¼-inch on the diameter of the rolls, thus increasing the surface speed by ¾-inch per two feet of sheet travel. On short sheets, a slight variation in speed between flux rolls and bottom rolls is not serious as the sheet clears the flux rolls before dangerous tension or buckling can develop. With longer sheets, any increase or decrease of length of sheet between the rolls due to unbalanced speeds will cause guide scratches or buckling and so spoil sheets. This condition also may cause bottom rolls to chip and peel. Thus the longer the sheets, the more accurately the rolls must be synchronized.

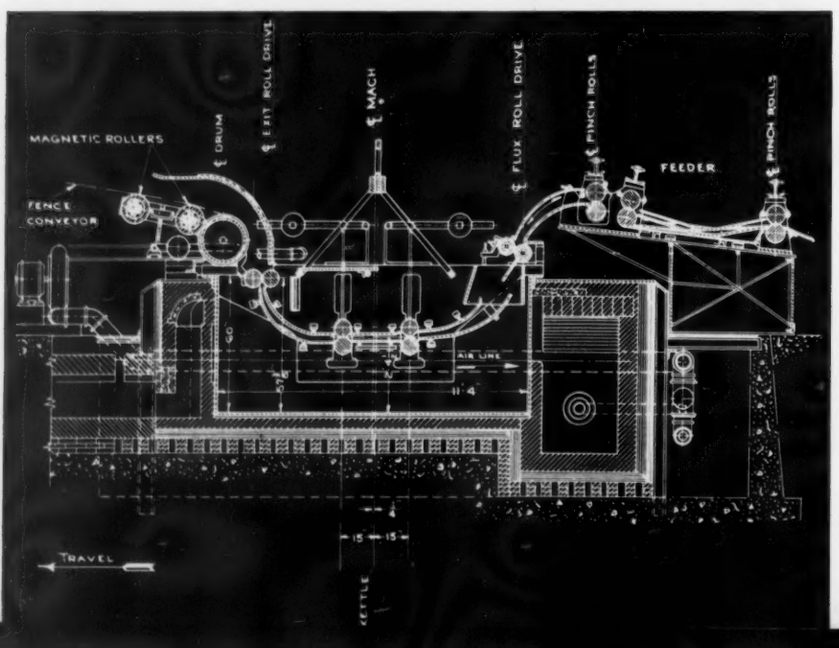
The new drive was designed with these problems in mind and also to provide for possible future demands for longer sheets than are now being galvanized. It may even be possible that in the near future continuous strip will be galvanized by the hot dip process.

Other new features of Aetna-Standard Engineering Co.'s equipment include a sulphur blower system that provides ample sulphur fumes at the exit rolls without causing long spangles to form at the edge of the sheet. Improved conveyor drives assure smoother operation at higher speeds with longer wire belt life. New roller levellers produce sheets with a greater degree of flatness, are free from chatter and are sized properly to level the complete range of gages of galvanized sheets.



Photomicrographs of galvanized coatings. Courtesy American Rolling Mill Co.

High speed pot layout



Trend Of Orders And Output Still Upward

Steelmaking In Sharp Rise, But Peak For Quarter In Sight

MARKET IN TABLOID ★

DEMAND — *Slightly heavier than month ago.*

PRICES — *Tin plate reduced $7 a ton.*

PRODUCTION — *Up 4 points to 61.5 per cent.*

SHIPMENTS — *Gaining; flat-rolled leads.*

■ ANOTHER sharp jump in steelmaking has been accompanied by a further rise in orders and definite improvement in business sentiment.

While the latest gain in operations to 61.5 per cent, a new peak for the year to date, largely is the result of expanding automotive needs and efforts of flat-rolled steel producers to work off heavy backlogs, demand from other consumers and for other products still is tending upward. Nevertheless, some leveling off in steelmaking is believed due, following the 10-point spurt of the last three weeks.

Sheet and strip mills are in a good position to maintain active operations the remainder of the year. With deliveries lengthening, buyers who failed to anticipate their requirements during the recent period of price weakness have entered the market with a surprisingly large amount of new business.

To what extent previous forward buying will affect production at some later date will be determined by the rate of consumption the next 60 days, but since producers have indicated all low-price tonnage must be shipped before the end of the year, the near-term operating outlook is favorable. Backlogs and activity in products other than sheets and strip are relatively lighter, with buying largely for early needs but with additional improvement noted in orders and shipments to date this month.

Tin Plate Price Cut Seen As Stimulus to Demand

Tin plate demand will be stimulated by the reduction of $7 a ton in this commodity, effective immediately for shipment through the first quarter of next year. Tin plate was not affected by the general price cut last June, and consumers lately have restricted purchases in anticipation of a lower market on 1939 contracts. Production, consequently, has been well below that of other leading steel products and shortly may be expected to turn upward.

Tangible evidence in steel markets of the reaction to election results is difficult to discern as yet, but general improvement in sentiment as a consequence thereof is a constructive factor.

Steel demand remains unbalanced in view of the rapid ascendency in importance of automotive tonnage. Last week, motorcar assemblies reached a new 1938 high of 86,300 units, a gain of 6270 over the week before and nearly 1000 ahead of the corresponding 1937 period. This is the first time this year automobile production has topped the level a year ago. General Motors assembled 42,100 units, against 38,825 the week before; Chrysler produced 20,350, against 18,250; Ford contributed 13,450, against 12,875; and all others 10,400, against 10,080.

Building And Shipwork Aid Heavy Steel Outlook

While the immediate outlook for demand for heavy steel products from railroads remains unfavorable, private and public building, engineering construction and shipwork offer encouraging prospects. Plans for projects financed in part by PWA funds are being pushed, since work must be under way by Jan. 1. Gross tonnage of boats under construction Nov. 1 was 45 per cent larger than a year ago, while a substantial steel tonnage is involved in battleships and cargo and passenger vessels still pending.

Last week saw six producing districts contribute to the 4-point rise in the national steelmaking rate to 61.5 per cent. At Pittsburgh, operations rose 3 points to 48 per cent, Chicago was up 1.5 points to 58 per cent and Youngstown rose 3 points to 66 per cent.

Other districts to raise schedules included Wheeling, up 5 points to 64 per cent; New England, up 1 point to 72 per cent; and St. Louis, up 6 points to 51.5 per cent. Unchanged areas were eastern Pennsylvania at 35 per cent, Cleveland at 77, Birmingham at 68, Cincinnati at 75 and Detroit at 82. Buffalo output dropped 2 points to 49 per cent.

Scrap prices continue strong in most districts, with the steelworks composite holding at $14.29. The tin plate reduction lowers the finished steel composite 70 cents to $56.50 and the iron and steel composite 27 cents to $36.29.

COMPOSITE MARKET AVERAGES

	Nov. 12	Nov. 5	Oct. 29	One Month Ago Oct., 1938	Three Months Ago Aug., 1938	One Year Ago Nov., 1937	Five Years Ago Nov., 1933
Iron and Steel	$36.29	$36.56	$36.54	$36.48	$36.50	$38.96	$30.25
Finished Steel	56.50	57.20	57.20	57.04	57.20	61.70	49.20
Steelworks Scrap ...	14.29	14.29	14.04	14.00	14.44	13.32	9.64

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:— Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Nov. 12 1938	Oct. 1938	Aug. 1938	Nov. 1937
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.74
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.455
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.435
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.10	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.15	3.20	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.10	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.15	3.20	3.65
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.35	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$34.00	$34.00	$34.00	$37.00
Sheet bars, open-hearth, Pitts.	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to 9/32-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Nov. 12 1938	Oct. 1938	Aug. 1938	Nov. 1937
Bessemer, del. Pittsburgh	$22.34	$22.34	$21.34	$25.26
Basic, Valley	20.50	20.50	19.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	21.34	25.26
No. 2 foundry, Pittsburgh	22.21	22.21	21.21	25.21
No. 2 foundry, Chicago	21.00	21.00	20.00	24.00
Southern No. 2, Birmingham	17.38	17.38	16.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	19.89	23.89
No. 2X, Del. Phila. (differ. av.)	23.215	23.215	22.215	26.135
Malleable, Valley	21.00	21.00	20.00	24.00
Malleable, Chicago	21.00	21.00	20.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.14
Gray forge, del. Pittsburgh	21.17	21.17	20.17	24.17
Ferromanganese, del. Pittsburgh	97.77	97.77	97.77	107.35

Scrap

Heavy melting steel, Pittsburgh	$14.75	$14.95	$15.20	$14.10
Heavy melt. steel, No. 2, E. Pa.	12.75	12.95	13.00	12.25
Heavy melting steel, Chicago	13.75	13.05	14.00	12.55
Rails for rolling, Chicago	17.25	16.25	18.25	15.10
Railroad steel specialties, Chicago	15.75	15.55	16.75	16.75

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.37
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Tin Mill Black Plate

Pittsburgh	3.15c
Chicago, Gary	3.15c
Granite City, Ill.	3.25c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate

Pittsburgh, Gary, Chgo.	4.65c
Granite City, Ill.	4.75c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New Cork, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.
Cut nails, C. L. Pitts. (10% disc. on all extras) $3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

* Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot strip to 23/16-in.

Pittsburgh, Chicago, Gary, Cleveland Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass., $4 higher.

Commodity Cold-Rolled Strip	
Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chgo., B'ham.	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex. U.S.S.	S.A.E.
¼-7/16-in., incl.	65-10 70-5
½-⅝-in., incl.	65-5 70
⅝-1-in., incl.	60-10 65
1⅛ and larger	60-5 60-5

Hexagon Cap Screws

Milled	50-10-5 off
Upset, 1-in. smaller	67½-10 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	70-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
7/16-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Clev., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to 9/32-inch incl.	43.00
Do., over 9/32 to 11/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$27.50

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.25
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birmingham	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.44	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, Phil, base, standard and copper bearing, $27.63.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del. Chicago	28.34
		Lyles, Tenn.	23.50

Silvery†

Jackson count, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $92.50
Do., del. Pittsburgh 97.77

Spiegeleisen, 19-21% dom.
Palmerton, Pa., spot 28.00
Do., New Orleans 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 97.75
2% carbon 102.75 1%, 112.75
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.50c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40%, lb. con. ti., ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-55%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract carloads, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05
Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c

88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, lb. 14.50c
Do, 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract, carloads, freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, freight allowed lb. 4.75c
Ton lots 5.25c
Less-ton lots 5.50c
Spot ¼c higher

Zirconium Alloy, 12-15%, carloads, gross ton $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.40
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.50
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.68	3.83	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.01	4.16	4.16	3.96	3.96	5.71	3.91	....	5.26
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	4.10	4.65	4.65	4.00	4.00	5.95	4.25	....	5.15
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	4.20	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	4.20	....	5.50
Portland, Oreg.	4.30	4.70	6.10	4.15	4.15	5.90	3.75	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	3.85	3.95	5.45	4.00	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	4.10	3.83	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.60	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Nov. 10

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$26.18 5 10 0	$17.60	2 2 0
Basic bessemer	....	16.19	1 18 6
Hematite, Phos. .03-.05	30.94 6 10 0*	.....	.....
Billets	$37.49 7 17 6	$42.05	5 0 0
Wire rods, No. 5 gage	53.67 11 5 6	42.95	5 2 6
Standard rails	$48.20 10 2 6	$48.19	5 15 0
Merchant bars	2.33c 11 0 0	1.95c to 2.00c	5 2 6 to 5 5 0
Structural shapes	2.25c 10 12 6	1.85c	4 17 6
Plates, †¼ in. or 5 mm.	2.45c 11 11 3	2.14c to 2.33c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.76c 13 0 0	2.95c	7 15 0°
Sheets, gal., 24 ga., corr.	3.34c 15 15 0	3.52c	9 5 0
Bands and strips	2.81c 13 5 0	2.19c	5 15 0
Plain wire, base	4.13c 19 10 0	2.33c to 2.76c	6 2 6 to 7 5 0
Galvanized wire, base	4.93c 23 5 0	2.99c to 3.09c	7 17 6 to 8 2 6
Wire nails, base	3.92c 18 10 0	2.66c to 2.85c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 5.06 1 0 3	.....	.....

British ferromanganese $92.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reic Mark
Fdy. pig iron, Si. 2.5	$25.94 5 9 0(a)	$15.91	598	$16.90	500	$25.24 63
Basic bess. pig iron	23.80 5 0 0(a)	.....	...	.....	...	27.84 (b) 69.50
Furnace coke	6.55 1 7 6	5.45	205	7.27	215	7.61 19
Billets	37.49 7 17 6	22.34	840	29.07	860	38.66 96.50
Standard rails	2.15c 10 2 6	1.38c	1,150	2.06c	1,375	2.38c 132
Merchant bars	2.59c 12 4 0††	1.30c	1,080	1.65c	1,100	1.99c 110
Structural shapes	2.34c 11 0 6††	1.27c	1,055	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm.	2.48c 11 14 3††	1.62c	1,350	2.06c	1,375	2.29c 127
Sheets, black	3.34c 15 15 0§	1.92c	1,600‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.92c 18 10 0	2.70c	2,250	4.13c	2,750	6.66c 370
Plain wire	4.13c 19 10 0	1.98c	1,650	2.48c	1,650	3.11c 173
Bands and strips	2.74c 12 19 0††	1.45c	1,210	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 72 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	†11.00
Bos. dock No. 1 exp.	13.00-13.25
New Eng. del. No. 1	13.00
Buffalo, No. 1	14.00-14.50
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	12.75-13.25
Chicago, No. 2 auto	11.50-12.00
Cincinnati, dealers	11.25-11.75
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	9.50-10.00
Detroit (industrial)	10.75-11.25
Eastern Pa., No. 1	14.50-15.00
Eastern Pa., No. 2	12.50-13.00
Federal, Ill.	12.25-12.75
Granite City, R. R.	12.75-13.25
Granite City, No. 2	11.75-12.25
Los Angeles, No. 1	13.50-14.00
Los Angeles, No. 2	12.50-13.00
N. Y. dock No. 1 exp.	11.50-12.00
Pitts., No. 1 (R. R.)	15.75-16.25
Pittsburgh, No. 1	14.50-15.00
Pittsburgh, No. 2	13.25-13.75
St. Louis, R. R.	12.75-13.25
St. Louis, No. 2	11.75-12.25
San Francisco, No. 1	12.00
Seattle, No. 1	10.00-12.00
Toronto, dlrs. No. 1	10.00-11.00
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	12.75-13.25
Chicago, dealer	12.50-13.00
Cincinnati, del.	10.00-10.50
Cleveland	13.00-13.50
Detroit	11.50-12.00
E. Pa., new mat.	14.50-15.00
E. Pa., old mat.	10.50-11.00
Los Angeles	12.50-13.00
Pittsburgh	14.50-15.00
St. Louis	11.00-11.50
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	13.25-13.75
St. Louis	7.75- 8.00
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	9.00- 9.50
Cincinnati, dealers	6.00- 6.50
Detroit	8.00- 8.50
†Los Angeles	3.75- 4.00
St. Louis	7.00- 7.50

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	12.50-13.00
Cincin., No. 1, deal.	6.50- 7.00
Cincinnati, No. 2	2.75- 3.25
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.50-14.00
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	7.25- 7.75
Cincinnati, dealers	3.75- 4.25
Cleveland	7.00- 7.50
Detroit	5.50- 6.00
Eastern Pa.	8.50- 9.00
Los Angeles	4.00- 4.25
New York	†3.50- 4.00
Pittsburgh	9.25- 9.75
St. Louis	4.50- 5.00
Toronto, dealers	4.25- 4.75
Valleys	8.50- 9.00

SHOVELING TURNINGS

Buffalo	8.50- 9.00
Cleveland	7.50- 8.00
Chicago	7.00- 7.50
Detroit	6.50- 7.00
Pittsburgh	10.25-10.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.25- 7.50
Cincinnati, dealers	3.25- 3.75
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.50- 6.00
New York	†2.50- 3.00
Pittsburgh	8.25- 9.75
Toronto, dealers	3.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.50-14.00
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	5.00

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	8.00- 8.50
Chicago	5.50- 6.00
Cincinnati, dealers	3.25- 3.75
Cleveland	7.25- 7.75
Detroit	5.50- 6.00
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.00- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	15.50-16.00

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	14.00-14.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	16.00-16.50
Chicago, leaf	15.50-16.00
Eastern Pa.	16.50-17.00
Pittsburgh	16.50-17.00
St. Louis	15.00-15.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	16.00-16.50
Chicago (2 ft.)	16.50-17.00
Cincinnati, dealers	16.00-16.50
Detroit	16.50-17.00
Los Angeles	15.00-17.50
Pitts., 3 ft. and less	16.50-17.00
St. Louis, 2 ft. & less	15.00-15.50

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	16.00-16.50
St. Louis	13.75-14.00
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	13.75-14.00

ARCH BARS, TRANSOMS

St. Louis	14.50-15.00

PIPE AND FLUES

Cincinnati, dealers	6.00- 6.50
Chicago, net	8.50- 9.00

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	6.75- 7.25
Eastern Pa.	13.50
New York	†8.50- 9.00
St. Louis	8.50- 9.00

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Chicago, No. 1 net	10.00-10.50
Eastern Pa., No. 1	15.00-15.50
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	13.00-13.50
Toronto, No. 1 dlr.	10.00

FORGE FLASHINGS

Boston district	†7.25- 7.50
Buffalo	12.00-12.50
Cleveland	11.50-12.00
Detroit	9.00- 9.50
Los Angeles	9.00
Pittsburgh	13.00-13.50

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.50-16.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	16.50-17.00
Pittsburgh, crops	17.00-17.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	16.50-17.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.00-17.50
New York	†15.00-15.50
Eastern Pa.	17.00-17.50
St. Louis	17.50-18.00

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00
Chicago, net	19.00-19.50
Eastern Pa.	21.50-22.50
St. Louis	18.50-19.00

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	14.00-14.50

SHAFTING

Boston district	†14.75-15.00
New York	†15.00-15.50
Eastern Pa.	19.50-20.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.00-15.50
Cincin., iron, deal.	13.25-13.75
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	16.50-17.00
Pittsburgh, iron	14.50-15.00
Pittsburgh, steel	16.50-17.00
St. Louis, iron	14.00-14.50
St. Louis, steel	15.00-15.50

NO. 1 CAST SCRAP

Birmingham	†12.50-13.00
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	11.50-12.00
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.75-11.25
Chicago, auto net	12.50-13.00
Chicago, railr'd net	11.50-12.00
Chicago, mach. net	12.00-12.50
Cincin., mach. deal	12.50-13.00
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.00-14.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.00-15.50
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, cupola	12.50-13.00
St. L., No. 1, mach.	14.25-14.75
St. Louis, agr. mach.	12.75-13.25
Toronto, No. 1, mach., net	11.00-12.00

HEAVY CAST

Boston dist. break.	†10.75-11.00
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break. net	13.00-13.50
Detroit, auto net	11.50-12.00
Detroit, break	9.50-10.00
Eastern Pa.	16.00
Los Ang., auto, net	13.00-13.50
New York, break.	†11.50-12.00
Pittsburgh, break	13.00-13.50

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	6.75- 7.25
Detroit, net	8.50- 9.00
Eastern Pa.	13.50
New York, fdy.	†10.00-10.50
St. Louis	10.00-10.50
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri. deal.	11.25-11.75
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.50-16.00
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	11.75-12.25

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	13.00
Swedish low phos.	13.00
Spanish No. Africa basic, 50 to 60% nom.	9.00
Tungsten, sh. ton. unit, duty pd. nom.	$21.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	30.00-32.00
So. African, 50-52% nom.	30.00-32.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 88

Pittsburgh — Sheet inquiries and orders have increased surprisingly, following a sharp slackening in new business after prices were advanced. Various consumers apparently are being forced to buy more than was anticipated, and sustained mill operations are in prospect the remainder of the year. Production of common and full-finished sheets is slightly above 55 per cent, but galvanized sheet output is declining seasonally but slowly, recently being at 63 per cent. Manufacturers' orders largely offset the tapering of the agricultural buying season for galvanized.

Cleveland—New sheet business is encouraging in view of heavy forward coverage recently. Best demand is from stove, refrigerator and radio manufacturers. Automotive interests are covered at least through this month but are taking heavy shipments. Some producers find difficulty meeting delivery requirements, backlogs in certain instances ranging from seven to 12 weeks.

Chicago — Flat-rolled steel buying is receiving some support from consumers who did little or no forward coverage recently. Production continues heavy and sizable backlogs indicate sustained output the remainder of the quarter. Deliveries are more extended, ranging up to seven weeks in some instances.

New York—Movement of sheets is well sustained, although new buying continues to suffer as the result of business last month at the time sharp concessions were available. Sellers look for a limited amount of new orders over the remainder of this year, particularly from jobbers who as a class covered themselves more fully at the lower prices than consumers. Prices continue steady.

Philadelphia — A surprising amount of new sheet business is coming out at full market prices. This includes orders from automotive interests which did not fully anticipate fall requirements. Some business also is coming from warehouses, and there are indications that some users of enameling sheets will reorder. Stove makers still are well covered at low prices. Quotations are being maintained, including galvanized.

Buffalo — Shipments against old orders are expected to extend through the quarter near their current rate, but little new business is looked for before the end of the year.

Cincinnati — Demand from consumers not previously covered is expanding, while orders for electrical sheets, not affected by recent price concessions, are improving steadily. Sheet mill operations are better than 60 per cent.

St. Louis—Sheet releases are the best so far this year. New orders, while small, are better than expected. Miscellaneous users account for most of recent improvement, although stove and refrigerator makers are taking substantial tonnages. Movement of enameling stock the past six weeks has been outstanding.

Birmingham, Ala.—Production of sheets continues at capacity. Much of the business is in roofing, although there has been some increase in manufacturers' sheets during the past few days.

Strip

Strip Prices, Page 89

Pittsburgh—Strip production continues to gain, moving above 50 per cent for both hot and cold-rolled material, with the latter still slightly more active.

New York—Consumption of narrow strip continues to expand moderately, resulting in a little better volume of new orders than was generally expected a fortnight or so ago, following substantial buying at price concessions which were then being offered. Automobile accessory manufacturers are issuing substantial releases for cold-rolled strip. Strip producers anticipate still higher operations before the year closes. Prices are firm.

Birmingham, Ala.—Strip is being produced in limited quantities and mostly on a program to suit mill convenience to build up reserve stocks of cotton ties.

Plates

Plate Prices, Page 88

Pittsburgh—Plate business is fair, with demand for shipbuilding better. Boiler and tank plate tonnages are light.

Cleveland — New business has failed to improve materially. Inquiries involving large tonnages are scarce, while miscellaneous demand for boiler, tank and other industrial purposes is substantially unchanged. Railroad requirements are at a minimum and little tonnage is used in conjunction with structural projects. Prices are firm.

Chicago—Plate demand is moderate, with fabricators ordering for many public projects as well as for private construction of tanks and oil refining equipment. A substantial portion of plates for Southern railway cars is expected to be produced here.

New York—Distribution of pending shipwork will give further impetus to recent slight gains in plate demand. Tank requirements are shrinking, though several units still are pending. Railroad buying is confined largely to miscellaneous repair needs.

Federal Shipbuilding and Dry Dock Co., Kearny, N. J., was apparent low bidder on six combination passenger-cargo vessels for the maritime commission on the opening of bids last week, bidding $3,148,000 on each of six ships. Next in order were Sun Shipbuilding and Dry Dock Co., Newport News Shipbuilding & Dry Dock Co., and Bethlehem Shipbuilding Co. Maritime officials said the number of contracts let would depend upon prices bid, but not more than six vessels will be awarded to any one company. The maximum number expected to be built is 12.

Philadelphia—At least two shipyards have distributed small tonnages of plates against existing contracts. While considerable ship tonnage is in prospect, actual releases have been disappointing. While railroads still are out of the market, prospects for government assistance have brightened the outlook. Boiler fabricators, as well as manufacturers of other equipment, are looking for more business from public utilities as a result of the more lenient attitude on the part of the government. Considerable utility equipment is said to be obsolete. Scandinavian plate releases against old contracts are helping operations of some mills.

Birmingham, Ala.—Plates are in somewhat better demand although there is no individually large business. A considerable upward swing has been given production by railroad bookings already made and output will be consistent for several weeks.

San Francisco—Prospective plate business, in addition to 9385 tons, including sheets and strip, for the Mare Island navy yard, includes 840 tons for a government vessel placed with Lake Washington Shipyards, Seattle. Total plate awards of 1090 tons bring the aggregate for the year to date to 38,382 tons, against 59,952 tons a year ago.

Seattle—Three heavy ship repair jobs, awarded to Todd Dry Docks, Seattle, costing in excess of $150,000 involve more than 150 tons of new plates. Lake Washington Ship-

yards, Seattle, is extending its ways and building a crane track preparatory to constructing the 198-foot survey steamer EXPLORER, calling for 1200 to 1500 tons of plates and shapes, not yet sublet. Boiler and tank work of fair proportions is distributed among shops in this area.

Plate Contracts Placed

1610 tons, 42-inch pipe, United States procurement department, Boston, to the Walsh Holyoke Steam Boiler Co., Holyoke, Mass.

Plate Contracts Pending

150 tons or more, three ship repair jobs under way at Todd Dry Docks, Seattle.

Bars

Bar Prices, Page 88

Pittsburgh—Bar orders are substantially heavier, automotive needs accounting for the bulk of new business. Miscellaneous demand appears steady. Schedules of most mills have been raised, and backlogs have been built up by many producers. Prices are firm.

Cleveland—Sharp gains in automobile assemblies the past few weeks are reflected in increased demand for commercial and alloy steel bars from partsmakers. Farm equipment requirements are seasonally low and no improvement is anticipated until late this year at the earliest. Specifications from railroads are limited to necessary repairs. Mill operations are substantially unchanged with deliveries available within two weeks. Prices are unchanged.

New York—As has been the case for some time special bars have been moving relatively more actively than the plain carbon grades. However, there is a general, although small, improvement all along the line, according to some leading sellers. Government and automotive specifications are standing out in particular, although the improvement in demand is diversified. Prices are steady.

Philadelphia—Merchant bar specifications are moderately heavier despite absence of railroads from the market. Hot-rolled alloy and cold-drawn grades continue outstanding, with producers of the latter operations at a fairly high rate. Prices are firm.

Birmingham, Ala.—With the exception of concrete reinforcing bars, which are at better than 60 per cent of capacity, little business in bars is evident. Some new bookings in this specification are in sight.

Buffalo — With automotive interests placing larger orders, bar demand has reached a new high for the current recovery. Buying still appears to cover only immediate needs of consumers, although users' stocks generally are small.

Pipe

Pipe Prices, Page 89

Pittsburgh—Tubular goods business so far this month is slightly below October, with little change expected for November as a whole. Line pipe activity is declining seasonally. Some recovery in standard pipe demand from its recent slump is looked for shortly. Prices are firm in most localities.

Cleveland — Shipments of standard steel pipe out of jobbers' stocks have improved somewhat this month but not to the degree anticipated. The cast iron pipe market offers more encouragement. A number of small municipalities are going ahead with water works improvement projects with the aid of federal allotments. Still additional work of this type is pending. J. B. Clow & Son Co., Cleveland, was recently awarded 700 tons of 4, 6, 8 and 10-inch cast pipe for a water distribution system, Mentor, O.; through Christopher Construction Co., Chagrin Falls, O. Largest local pending project calls for 825 tons of 4, 6, 8, 10 and 12-inch cast pipe for extension to distribution system, Akron, O.; bids Nov. 21. Cast and steel pipe prices are firm.

Chicago—PWA projects are being speeded, resulting in a flurry of cast pipe inquiry. With work sponsored by federal grants required to be started by Jan. 1, municipalities are pushing plans. Several pending jobs will take over 1000 tons each, while numerous lots involve more than 100 tons. Private work is relatively quiet.

New York—Heating contract for the Queensbridge housing development has been let to Baker Smith & Co. and the plumbing contract to Jarcho Bros. Inc., involving a total of 1500 to 1700 tons of steel pipe. Pipe demand outside the building field is rather dull.

Birmingham, Ala. — Birmingham plants report a few scattered bookings mostly from WPA sources but only in sufficient quantity, thus far, to maintain the present four-day production schedules. Worthwhile bookings are in prospect.

San Francisco—Los Angeles has placed 1713 tons of 6 and 8-inch cast pipe, largest order in over two months. National and American Cast Iron Pipe companies shared in the order. Total lettings of 2398 tons bring the year's bookings to 29,123 tons, compared with 25,114 tons a year ago. Long Beach, Calif., has ordered 768 tons of 1¼ to 12-inch seamless line pipe from Crane Co.

Seattle—Federal loans and grants have been approved for numerous Pacific Northwest projects, and demand for cast pipe and pumping equipment is expected to improve before the end of the year. Ten such jobs involve $430,736.

Cast Pipe Placed

1713 tons, 6 and 8-inch, class 150 and 250, specification 2819, water and power department, Los Angeles, divided as follows: American Cast Iron Pipe Co., Birmingham, Ala., 771 tons; National Cast Iron Pipe Co., Birmingham, Ala., 942 tons.

1610 tons, 42-inch pipe for the United States Procurement department, Boston, to the Walsh Holyoke Steam Boiler Co., Holyoke, Mass.

700 tons, 4, 6, 8 and 10-inch, water distribution system, Mentor, O., to J. B. Clow & Son Co., Cleveland; through Christopher Construction Co., Chagrin Falls, O.

Cast Pipe Pending

825 tons, 4, 6, 8, 10 and 12-inch, extension to distribution system, Akron, O.; bids Nov. 21.

275 tons, 3 to 6-inch and alternates, Olympic View district, Edmonds, Wash.; bids in Nov. 10.

150 tons, 16-inch, specification 2833, Los Angeles; bids Nov. 14.

133 tons, 4 to 12-inch, Modesto, Calif.; bids opened.

Steel Pipe Placed

768 tons, 1¼ to 12-inch, seamless line pipe, specification 587, Long Beach, Calif., to Crane Co., Los Angeles.

Wire

Wire Prices, Page 89

Cleveland — Moderate improvement in manufacturers' wire demand originates principally among automotive suppliers, although specifications elsewhere have increased lately. Jobber demand is more active, with stocks well balanced. Production has advanced to the best level of the year. Wire and wire products prices are firm.

New York—Manufacturers' wire continues in particularly good demand among the various wire products, most of which are moving more freely. Automobile requirements have taken a noticeable spurt this month and there is improved buying of spring wire from the furniture trade.

Birmingham, Ala. — Bookings of wire and wire products continue a slightly upward trend, but not in sufficient quantity to speed up production. Agricultural industries are ac-

countable for a large part of the business.

Rails, Cars

Track Material Prices, Page 89

Illinois Central is said to be negotiating for another lot of 1000 freight cars on a lease-purchase plan. A few weeks ago it purchased 1000 from American Car & Foundry Co. on this basis.

Seaboard Air Line has awarded a seven-car streamlined train to Edward G. Budd Mfg. Co., Philadelphia, with an oil-electric locomotive, the unit for which will be built by Electro-Motive Corp., LaGrange, Ill.

Missouri Pacific has awarded about 800 tons of steel parts for rebuilding 1000 stock cars in its own shops, to American Car & Foundry Co.

Worcester Street Railway Co., Worcester, Mass., has ordered 10 motor coaches from American Car & Foundry Motors Co., New York.

Locomotives Placed

Seattle light department, one 35-ton diesel-electric locomotive for Skagit river project, to Skagit Steel & Iron Works, Sedro-Wooley, Wash., at $19,500.

Rails Placed

Mobile & Ohio, 3000 tons 90-pound rails, plus fastenings; to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Locomotives Pending

Reading railroad and Central of New Jersey, 15 diesel switchers for joint use; bids in.

Shapes

Structural Shape Prices, Page 88

Pittsburgh—Activity in shapes is steady, aided by several large inquiries. Bridges predominate in new work, including 18,000 tons in New York city, 2500 tons at Brownsville, Nebr., and Rockport, Mo., and 1300 tons at Kansas City, Kans.

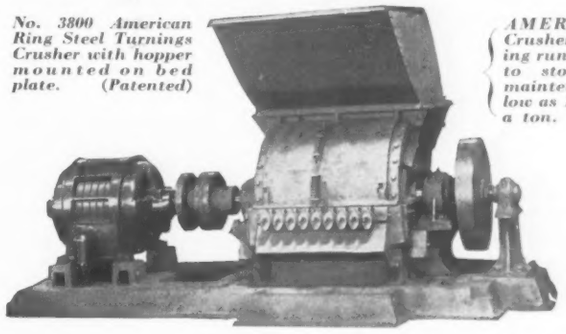
Chicago — Structural business is well maintained, with private building tending upward though still overshadowed by public works. A large portion of demand is made up of small tonnages, although more large projects are appearing.

Cleveland — Structural awards are lagging. However the outlook is substantially more encouraging, despite failure of local bond issues to pass in the recent election. Bids are expected out soon for considerable tonnage in connection with approaches to the new Main street bridge, Cleveland. Fort Pitt Bridge Co., Pittsburgh, recently booked 550 tons for the Edwin Denby high school, Detroit. Prices have shown a stronger tendency recently on both large and small projects. Most fabricators are now fairly busy and there is not the scramble for work as was the case a month or two ago.

Philadelphia—John McShain Inc., Philadelphia, is low on the general contract for the Philadelphia courthouse taking 2400 tons of structurals and 130 tons of reinforcing, bids opening Nov. 10. Norfolk navy yard takes bids Nov. 16 for an extension to structural shop and runways taking 1500 tons. Belmont Iron Works, Philadelphia, has been awarded 1250 tons for extension to Charleston navy yard. Private work is more active with pending jobs including $4,000,000 apartment, Pennsylvania avenue at 26th street, Philadelphia, for which Wark & Co., Philadelphia, is general contractor. Price situation is unimproved.

Buffalo—The structural market is now faced with the most jobs in

No. 3800 American Ring Steel Turnings Crusher with hopper mounted on bed plate. (Patented)



AMERICAN Ring Crushers are crushing run-of-mine coal to stoker size at maintenance costs as low as 1/10 of a cent a ton.

EXTRA PROFITS by crushing your turnings!

Many shops and manufacturing plants are making extra profits by crushing their turnings into chips with American Ring Steel Turning Crushers. Chips not only bring a higher price, but they are easy to handle, require less storage space and are easier to ship.

Your long turnings will cease to be a nuisance after you put an American Ring Crusher on the job. It will pay for itself in a very short time, after which it will pay you a large weekly profit.

Do you want this extra profit?

ORIGINATORS OF THE ROLLING RING CRUSHER PRINCIPLE

AMERICAN PULVERIZER CO.
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more than a year, due principally to an influx of PWA money. With drawings completed fabricators are busily engaged in figuring numerous jobs, some of fair size, now being bidded. Topping the list will be the 1500 ton Kenmore high school, bids Nov. 15 and 500 ton Elmira reformatory, Nov. 17.

St. Louis—Small jobs predominate in structural awards here. Operations at fabricating yards remain unchanged at around 35 per cent of capacity. The only large inquiries are a bridge at Kansas City, 1200 tons and 600 tons for a St. Louis and San Francisco railroad elevation in Oklahoma.

San Francisco — The Mercer Island bridge, Seattle, on which bids open Nov. 29 involves 5245 tons of shapes, in addition to more than 13,000 tons of reinforcing bars. Activity otherwise reflects the lull common to this period. Awards of 2177 tons raise the year's total to 134,381 tons, against 134,972 a year ago.

Seattle — Public works projects are furnishing practically all the business taken by fabricating plants, as private construction is of small proportions. The largest job out for figures is the Lake Washington pontoon span calling for about 4100 tons of shapes, bids at Olympia Nov. 29. L. H. Hoffman, Portland, has the general contract for a state bridge over Lewis river, Washington, requiring 368 tons. Bids to highway department, Portland, Oreg., include a bridge over the Umpqua river, 393 tons.

Shape Contracts Placed

2210 tons, Austin avenue subway, Chicago, to American Bridge Co., Pittsburgh.

1325 tons, Grove highway bridge, Grove, Okla., to Virginia Bridge Co., Roanoke, Va.

1140 tons, pipe and copper shop, Philadelphia navy yard, to Bethlehem Steel Co., Bethlehem, Pa.; through Turner Construction Co., Philadelphia.

1000 tons, Queensbridge housing project, New York city, to Simon Holland & Son.

925 tons, water softening plant, Fridley, Minn., for city of Minneapolis, to Minneapolis-Moline Power Implement Co., Minneapolis.

918 tons, post office, Providence, R. I., to Phoenix Bridge Co., Philadelphia.

600 tons, addition to buildings, for Corn Products Refining Co., Pekin, Ill., to Vierling Steel Works, Chicago.

560 tons, vessel, for government, for Alaskan waters, Seattle, to Lake Washington shipyards, Seattle, Wash.

550 tons, Edwin Denby high school, Detroit, to Fort Pitt Bridge Works, Pittsburgh.

540 tons, New York state highway bridge, Herkimer county, to Phoenix Bridge, Co., Phoenixville, Pa.

475 tons, San Marcus bridge, Caldwell county, Texas, 345 tons of beams to Mosher Steel Co., Houston, Tex., and 130 tons of truss to Illinois Steel Bridge Co., Jacksonville, Ill.

350 tons, supports, for Sun Oil Co., Marcus Hook, Pa., and Toledo, O., to Bethlehem Steel Corp., Bethlehem, Pa.

315 tons, state bridge RC-3998, Hornell, N. Y., to American Bridge Co., Pittsburgh.

310 tons, 36 miscellaneous bridges, Ashfield, Conway and Montague, Mass., to American Bridge Co., Pittsburgh.

285 tons, East 158th street and Claremont Parkway bridges, New York, to Phoenix Bridge Co., Phoenixville, Pa.

240 tons, H and sheet piling, two state bridge projects in Idaho, to Bethlehem Steel Co., Seattle; Sather & Son, Seattle, general contractor.

235 tons, addition, senior high school, Bradford, Pa., to Buffalo Structural Steel Co., Buffalo.

235 tons, transmission towers, Great Northern Paper Co., Millinocket, Me., to American Bridge Co., Pittsburgh.

230 tons, sheet piling, for Columbus & Southern Ohio Electric Co., Groveport, O., to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, bridges, Clear Creek and Arapahoe county, Colorado, to unnamed interests.

200 tons, crane for 11th naval district, San Diego, Calif., specification 8937, to unnamed interest.

200 tons, auditorium and gymnasium building, Richmond, Ind., for board of education, to Bethlehem Steel Corp., Bethlehem, Pa.

200 tons, city hall and police station, Nashua, N. H., to Lyons Iron Works, Manchester, N. H.

175 tons, six beam bridges, Barre, Mass., to American Bridge Co., Pittsburgh.

155 tons, machine shop, Birdsboro Steel Foundry & Machine Co., Reading, Pa., to Truscon Steel Co., Youngstown, O.

150 tons, tunnel supports, Green Mountain dam, Colorado-Big Thompson project, Colo., to unnamed interest.

150 tons, curb angles, procurement division, treasury department, New York, to Phoenix Bridge Co., Phoenixville, Pa.

150 tons, building, for Monarch Machine Tool Co., Sidney, O., to Burger Iron Works, Akron, O.; through Green & Sawyer, Lima, O.

145 tons, power house, Boys' Industrial school, Harrisburg, Pa., to Reading Steel Products Co., Reading, Pa.

140 tons, public school, No. 159, Bayside, Long Island, to Bethlehem Fabricators, Bethlehem, Pa.

135 tons, milk distributing plant, Syracuse, N. Y., to Smith & Caffrey Co., Syracuse, N. Y.

130 tons, Dearborn street bridge repairs, Chicago, to Joseph T. Ryerson & Sons, Inc., Chicago.

130 tons, laboratory building, Underhill avenue, Brooklyn, N. Y., to Voepel Iron Works.

130 tons, process building, for Hercules Powder Co., Parlin, N. J., to Morris-Wheeler Co., Philadelphia.

Shape Awards Compared

	Tons
Week ended Nov. 12	**15,503**
Week ended Nov. 5	**40,320**
Week ended Oct. 29	**30,773**
This week, 1937	**10,242**
Weekly average, year, 1937	**23,251**
Weekly average, 1938	**19,863**
Weekly average, October ..	**17,160**
Total to date, 1937	**1,124,306**
Total to date, 1938	**913,697**

Includes awards of 100 tons or more.

125 tons, theatre, Wildwood, N. J., to Belmont Iron Works, Philadelphia.

125 tons, radial gates and hoists, specification 1116-D, Boise project, Idaho, to unnamed interest.

125 tons, heating plant building, Anapolis, Md., to Frank M. Weaver & Co., Lansdale, Pa.

120 tons, grade school, Seaford, Long Island, to August Bellon.

115 tons, warehouse, Rockville Center, Long Island, to August Bellon.

100 tons, sheet piling, east approach to Main street bridge, Cleveland, to Bethlehem Steel Co., Bethlehem, Pa.; through Johnson Foundation Co., Cleveland.

Shape Contracts Pending

4100 tons, Lake Washington pontoon bridge project, Seattle; bids to Toll Bridge authority, Olympia, Wash., Nov. 29.

2500 tons, bridge across Missouri river, Brownsville, Nebr.-Rockport, Mo., for Atchison county.

2400 tons, courthouse, Philadelphia; John McShain Inc., Philadelphia, low, also includes 130 tons of reinforcing bars, bids Nov. 10.

1500 tons, Norfolk navy yard, extension to structural shop and runways; bids Nov. 16.

1500 tons, high school, Kenmore, N. Y.; bids Nov. 15.

1300 tons, third and fourth crossing, specification 807, Delta, Calif., for bureau of reclamation.

1200 tons, Kansas City, Kans., Wyandotte county, bridge; bids Nov. 22.

1200 tons, state building, Chicago.

900 tons, buildings, veterans' home, Rocky Hill, Conn., for state.

765 tons, six bridges, scattered locations, state of Wisconsin; bids Nov. 18.

600 tons, Grand river dam, Okla., elevation for St. Louis & San Francisco railroad.

600 tons, senior and junior high school, Lockport, N. Y.; bids Nov. 28.

500 tons, two new cell blocks, Elmira reformatory, Elmira, N. Y., bids Nov. 17.

500 tons, Newport, Ark., flood wall.

500 tons, Washington high school, East Chicago, Ind., for board of education.

450 tons, South Dillard bridge, Douglas county, Oregon, for state.

413 tons, over-crossing, Oak street, Bakersfield, Calif., for state; bids Nov. 23.

400 tons, building, Lehigh Portland Cement Co., Union Bridge, Md.

393 tons, Oregon state span, Umpqua river; bids to highway department, Portland, Nov. 18.

368 tons, Washington state, Lewis river bridge; L. H. Hoffman, Portland, general contractor.

300 tons, Marked Tree, Okla., drainage project.

300 tons, state school and hospital buildings, Southbury, Conn.

300 tons, inmate building No. 2 and garage, Niantic, Conn., for state.

250 tons, state hospital buildings, Newton, Conn.

200 tons, children's school, Ft. Knox, Ky., for government.

200 tons, bridge, San Fernando road, Glendale, Calif., for federal engineers.

200 tons, sheet piling, Morgan county, Ohio, project. No. 270; Merry & Cisler, Caldwell, O., low.

200 tons, overhead crossing, Sugar City, Idaho, for state.

200 tons, rural school, Naples, N. Y.; bids Nov. 30.

185 tons, Pike county, Ohio, state highway project; bids Nov. 22.

181 tons, sheet piling and structurals for delivery at Yorba, Calif.; bids in.

171 tons, Verdugo Wash. outlet bridge,

United States engineer office, Los Angeles, proposal 178; bids in.

160 tons, Washington state span, Okanogan county; bids at Olympia, Nov. 22.

150 tons, school building, Pike county, Ohio; bids Nov. 18.

135 tons, state grade elimination, Blakeslee, O.

130 tons, state overpass, McGill, Nev.

125 tons, rural school, Arcade, N. Y.; bids Nov. 18.

125 tons, warehouse, for Simmons Machine Tool Co., Albany, N. Y.

125 tons, freight house building, Bronx Terminal market, New York, for procurement division, U. S. treasury department.

120 tons, Oregon state undercrossing, Klamath county; bids at Portland, Nov. 18.

114 tons, sheet piling, bureau of reclamation, invitation 24,665-A, Blaidell, Ariz.; bids in.

100 tons, state highway bridge, Lackawanna county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Nov. 18.

100 tons, rural school, West Seneca, N. Y.; bids Nov. 22.

100 tons, girder bridge, Lackawanna county, Pennsylvania; bids Nov. 17.

Unstated, material for span, diversion canal hatchery, Leavenworth, Wash. bids to reclamation bureau, Denver, Nov. 21; spec. 1136-D.

Reinforcing

Reinforcing Bar Prices, Page 89

Pittsburgh — Reinforcing bar prices are holding well in practically all sections. The tonnage in the market has not changed materially, although activity is fair. The federal housing project at Louisville, Ky., will shortly reach the bidding stage, as will the federal barracks at Ft. Thomas, Ky. Both of these are fairly large projects.

Cleveland—Reinforcing bar sales are slow, with schools and other public projects predominating. Awards recently have been confined to a few individual lots of less than 100 tons. Pending and prospective work points to little change in demand the remainder of the month.

Chicago — Pending business is heavier, mostly in small lots. Awards include a number of larger tonnages, such as 243 tons for a telephone building and 147 tons for an armory in Chicago and 246 tons for barracks at Rantoul, Ill. Chicago subway plans are expected late this month. Bar prices are reported firmer.

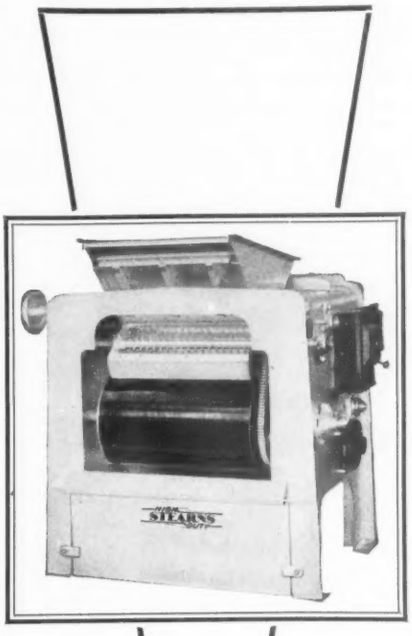
Philadelphia — Public Works administration has approved 20 projects costing $2,837,033, bringing the total in Pennsylvania to 335 jobs, costing $115,963,247 of which less than $15,000,000 has been awarded.

San Francisco—Awards for more than 40 projects involved 4136 tons, bringing total bookings so far this year to 127,171 tons, against 86,621 tons a year ago. The largest order was 700 tons for a concrete apron wharf for Los Angeles. About 2000 This work involves considerable bar tonnage, but large part will probably not become active until next year. Several current jobs include Pennsylvania railroad grade elimination work, Absecon, N. J., taking 200 tons of bars and 750 tons of shapes, bids Nov. 15.

Concrete Bars Compared

	Tons
Week ended Nov. 12	**2,287**
Week ended Nov. 5	**11,828**
Week ended Oct. 29	**6,555**
This week, 1937	**3,640**
Weekly average, year, 1937	**6,061**
Weekly average, 1938	**6,511**
Weekly average, October ..	**6,990**
Total to date, 1937	**289,370**
Total to date, 1938	**301,358**

Includes awards of 100 tons or more.



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Behind the Scenes with STEEL

What About the Bull?

■ Well, the election has come and gone and business is getting geared to go places. But according to Eddie Dowling, theatrical producer who has also had his fling with politics, there are still four kinds of "isms" in the world. *Socialism,* he says, means that if you have two cows, you give one to your neighbor. Under *Communism,* you give both cows to the government, which gives you back some of the milk. Under *Fascism,* you keep the cows and give the milk to the government, which then in turn sells some back to you. And under *New Dealism,* according to some folks, you shoot one cow; milk the other, and pour the milk down the sink!

Button, Button . . .

■ Do you remember (how can you forget) the beautiful lassie who adorned Goodrich's adv. page two weeks ago? Sitting there in her very lovely birthday suit, she apparently bothered some of the boys plenty. And especially did she catch the appraising eye of Geo. P. Hansen down in Canton, O. He says he noticed her in another publication (mentioning no names) but she appeared quite indistinct and he passed her by. STEEL's high class printing job stopped him cold, however, and he and some of his pals puzzled over what possible connection she could be having with the industry. And then it dawned on them. The message she carried to steel men, they realized, was "*Navel* Armament".

Swell Gift

■ The office boy trotted in last week and handed us a package which has become our pride and joy. Everyone around the office and our neighbors out home are plenty jealous. We've never been much of a handy man around the house, but since Harry Mayoh of the American Screw Co. sent along that swell Utility Kit of Phillips Screws and Drivers we've been inspired to put the leg back on that old table th' little woman's been harping about and maybe we'll even go so far as to start our own work bench. Thank you, Mr. Mayoh!

Surveyologists Note

■ In these days of super surveys and super, super surveys we are inclined to agree with the strategy of Walter Rybolt, adv. mgr. for R. K. LeBlond Machine Tool Co. who takes all the starch out of his caller's approach with a sign sitting on his desk which reads: *You've Made a Survey . . . So What?* It stops the boys cold.

Sidewalk Supers

■ And over in New York last Thursday morning at 10:30 a white satin ribbon was cut to mark the official opening of the original Sidewalk Superintendents' Club, organized in recognition of the fine art of excavation watching. The Club was formed especially in connection with the new 16-story building in the south block of Rockefeller Center. Headquarters consist of a sheltered area 100-feet long directly overlooking the excavation. A rotunda on each end protects the club members from sidewalk traffic. A coat-of-arms bearing the Dutch motto, "De beste stuurlui staan aan wal" (The best pilots stand on shore) graces each rotunda. Any person professing undying curiosity and interest in excavation work is eligible for membership, and the club will conduct a suggestion and complaint box for use of members and guests. And so, monarchs of all they survey, members can feast their eyes until the inexorable routine of their own lives drags them away.

—SHRDLU

tons is involved in projects on which bids have been opened the past few days.

Seattle—One of the year's major projects, the Lake Washington pontoon bridge at Seattle, is up for figures to the toll bridge authority, Olympia, Nov. 29. Tenders will be received on 11 schedules involving a total of 13,500 tons of reinforcing bars. Fair tonnages are involved in the East forty-fifth street viaduct, Seattle, bids soon. Business pending includes 750 tons for barracks at Fort Lewis, general contract awarded.

Reinforcing Steel Awards

700 tons, concrete apron wharf, specification 979, Los Angeles, to unnamed interest.

225 tons, male infirmary, Michigan state hospital, Kalamazoo, Mich., to Calumet Steel Co., Chicago.

225 tons, Bellingham, Wash., city hall, to Seattle Steel Co.; S. S. Mullen, Seattle, general contractor.

170 tons, custodian building and power plant, children's village, Coldwater, Mich., to Calumet Steel Co., Chicago.

145 tons, Sunset grammar school, Coaling, Calif., to Soule Steel Co., San Francisco.

140 tons, bureau of prisons, Leavenworth, Kans., to Sheffield Steel Corp., Kansas City, Mo.

140 tons, intermediate school, Wichita, Kans., to Sheffield Steel Corp., Kansas City, Mo.; George C. Christopher & Sons, contractors.

125 tons, water supply improvement, Jacksonville, Ill., to Laclede Steel Co., St. Louis; Missouri Engineering Co., contractor.

117 tons, grade crossing elimination, Erie railroad, Allendale, N. J., to Truscon Steel Co., Youngstown; George H. Brewster & Sons, Bogota, N. J., contractor.

100 tons, building, Spencer Lens Co., Buffalo, N. Y., to Joseph T. Ryerson & Son, Chicago; Gillmore, Carmichael & Olson, Buffalo, contractors.

100 tons, sewage disposal plant, Sharpsville, Pa., to Republic Steel Corp., Cleveland, through Patterson-Leitch Co., Cleveland.

100 tons, aviation facilities, San Clemente, Calif., to unnamed interest.

Reinforcing Steel Pending

13,500 tons, Lake Washington pontoon bridge, Seattle, Wash.; bids to toll bridge authority (11 schedules) Olympia, Nov. 29.

1200 tons, penitentiary, Terre Haute, Ind.

465 tons, penitentiary, Ashland, Ky.

450 tons, junior and senior high school, Grosse Point, Mich.

427 tons, place, fish control station, specification 804, Grand Coulee dam, Wash.; Nat McDougall Portland, Oreg., low at $272,718.

350 tons, Huntington hospital, Pasadena, Calif.; bids Nov. 15.

300 tons, Newport, Ark., flood wall.

280 tons, municipal auditorium, Topeka, Kans.

250 tons, Chanute field, Ill., aircorps barracks foundation; A. T. Anderson, Chicago, low.

220 tons, bridge, Lawrenceburg, Ind.

200 tons, bridge over Ohio river, Owensboro, Ky.

200 tons, Marked Tree, Ark., drainage project.

195 tons, state highway projects in

Oregon; bids at Portland, Nov. 17 and 18.
194 tons, over-crossing, Oak street Bakersfield, Calif.; bids Nov. 23.
190 tons, girls' dormitory, Michigan state college, E. Lansing, Mich.
180 tons, Lewis river state bridge, Washington state; L. H. Hoffman, Portland, general contractor.
175 tons, Decatur, Ill., county building; J. L. Simmons, Co., Decatur, low.
153 tons, six bridges, scattered locations, state of Wisconsin; bids Nov. 18.
135 tons, Little Rock, Ark., flood wall.
130 tons, bridge, Chicago, Rock Island & Pacific railway, Kismet, Kans.
118 tons, Newport, Ark., drainage project.
100 tons, baker and cook school, Presidio, San Francisco; bids Nov. 23.
100 tons, rural school, Naples, N. Y.; bids Nov. 30.
Unstated, federal barracks, Ft. Thomas, Ky.
Unstated, federal housing project, Louisville, Ky.
Unstated, East Forty-fifth street viaduct, Seattle; 204,000 available; bids to city engineer soon.
Unstated, 220-man barracks, Fort Lewis, Wash.; bids to army quartermaster, Nov. 30.

Pig Iron

Pig Iron Prices, Page 90

Cleveland—Pig iron releases continue to gain, with November shipments expected to be about 10 per cent ahead of October. Improvement in automotive needs is counted on to more than compensate for the seasonal letdown in demand from heating equipment foundries. Jobbing foundries are slightly more active.

Chicago—New pig iron business at $21, although spotty, has exceeded expectations. Shipments continue to increase, with November deliveries likely to be the best of the year to date. While demand for automotive castings has expanded foundry operations, miscellaneous and farm equipment needs contribute to the better schedules.

New York—Pig iron consumption in this district is expanding slowly. Manufacturers of stoves and heating units are taking a better tonnage, but the jobbing situation is spotty, although apparently slightly more active, and soil pipe makers are beginning to taper their production as the winter season approaches. Most consumers contracted for their current needs prior to the price advance at the beginning of this quarter, with a result that new orders remain light.

Philadelphia—Both jobbing foundries and other melters are increasing their operations, with the result that pig iron shipments still are rising, since plant inventories are not excessive. Some new business has appeared at the recent $1 advance, but consumers generally are well protected.

Buffalo—Pig iron shipments hold at the year's best level. Foundries producing automotive castings report fair business, but miscellaneous foundries and heating equipment manufacturers have the best schedules, many working five days a week.

Cincinnati—Pig iron deliveries are heavier for the third consecutive month, with the melt expanding slowly as a result of automotive and heating equipment requirements. Diversion of one district blast furnace from merchant iron to supplying hot metal to a mill may result in blowing in another stack on merchant iron within a few weeks.

St. Louis—Pig iron consumption has increased further, with gains noted in basic, foundry and malleable grades. Schedules of stove and heating equipment and farm implement manufacturers and jobbing foundries are better than a month ago, with operations of other melters steady. Pig iron shipments so far this month are the best for the year to date. New business, although light, is gaining.

Birmingham, Ala.—Output of pig iron continues heavy with 16 of 18 furnaces in blast, although there has been a slight recession in shipping instructions. Melters define the market currently as strong and the outlook as reassuring.

Toronto, Ont.—The pig iron melt averages about 60 per cent, a gain of 10 points the past three to four weeks. Sales generally range from 50 to 300 tons, with consumers interested only in spot needs. Shipments over the Great Lakes have been suspended for the year.

Scrap

Scrap Prices, Page 92

Philadelphia—The market tends toward the strong side as a result of export buying and strength in the Middle West, but prices so far are quotably unchanged. A large independent mill continues to hold up shipments of No. 1 and No. 2 heavy melting steel but has issued releases on machine shop turnings. The same interest also has placed a new order for turnings at $9. Steelmaking grades, including heavy cast, are moving fairly well in other directions against existing contracts. A district autobody maker sold about 3600 tons of new compressed sheets at the equivalent of about

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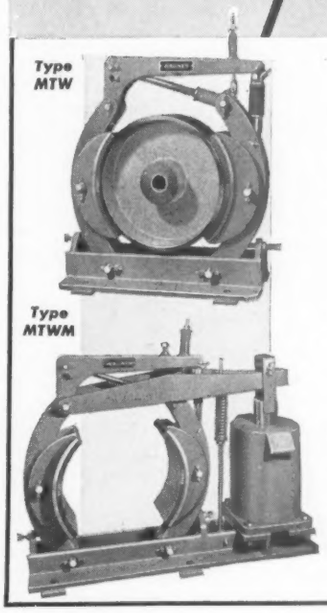

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HOTEL CLEVELAND Cleveland

$15, delivered the nearest mill, substantiating current quotations. Part of this material is understood to be applied against export orders. At least three boats are scheduled to leave here this month, with brokers offering $13 and $14, Port Richmond for No. 1 and No. 2, respectively. Specialties are firm but none too active.

Pittsburgh — Scrap dealers are optimistic despite a quiet market. Down-river interests show the best activity in open-hearth grades, paying $15 and $15.25 for No. 1 steel. Other sources are quiet and prices are unchanged. Part of the recent Pennsylvania railroad list is understood to have come here for consumption at about $16.50, the first large railroad offering in some weeks not to have been sold for export.

Cleveland—Dullness continues in all grades of scrap with shipments on contracts the only activity. Prices have undergone no change. Heavy grades are moving to other consuming centers.

Chicago—Prices of a number of scrap grades are higher, although heavy melting steel is unchanged at $13.50 to $14 for No. 1 material. The market is strong at this level, with brokers paying $13.75. A higher market is looked for on subsequent mill purchases. Angle bars, machine shop turnings and car axles are higher.

New York—While scrap buying is quiet, sentiment is better and in heavy breakable cast scrap for domestic account prices have been increased 50 cents to $11.50 to $12. Influencing the better tone here are recent advances at Pittsburgh. In the export market, stove plate is now quotable at $10.50, docks, as against $10 to $10.50 recently; and No. 2 cast at $11.50, against $11 to $11.50.

Buffalo—Another sale of 8000 tons of No. 2 heavy melting steel to a local mill has given added strength to the scrap market here. The same mill took a similar amount a short time ago and at the same price—$12 to $12.50. Demand from steelworks otherwise is dull, while purchases by foundries and trading among dealers are light.

Detroit — Hydraulic compressed sheets have advanced 25 cents to $11.50 to $12, but in general the market is weakened by absence of buying. Whether or not strength in bundles is temporary will be disclosed shortly with the appearance of another large list.

St. Louis — Interest in the market has broadened, and prices are stronger. A district mill has bought 7500 tons of heavy melting steel for delivery the next 60 days. Mill inventories have shrunk materially the past two months and inquiries are more active. Rerolling rails are up $1.

Birmingham, Ala. — Some movement of No. 1 heavy melting at $12, delivered, was reported during the week by local dealers. Otherwise the scrap market remains particularly inactive. Prices are wavering somewhat.

Seattle — Japanese shipments feature the trans-Pacific freight situation, water rates ranging from $5.50 on conference lines to $3.75, free in and out, for chartered vessels. Some new business is being placed, but most shipments are against old orders. No. 1 steel is steady at $12 to $12.50. Domestic demand is moderate.

Toronto, Ont. — Scrap trading is quiet and spotty, demand being confined to heavy melting steel and machinery cast. Shipments from rural districts have quickened in anticipation of winter weather. Prices are firm, with dealers offering $10 to $11 for heavy melting steel, against $10 to $10.50 formerly. Other grades are unchanged.

Warehouse

Warehouse Prices, Page 91

Cleveland — Warehouse shipments hold about even with the comparable October period. Political developments induce some distributors to predict a 10 per cent gain in total November business. Inventories are somewhat out of line with current requirements, particularly in flat-rolled material.

Chicago — Business is about equal to the rate a month ago though below the high point for October. A year-end letdown is looked for, starting about the middle of November.

Philadelphia—Sales the first half of November were slightly ahead of the October period. Ordering is fairly well diversified as to consumers and products. Bars and sheets, including stainless, are outstanding in demand. Prices are none too steady.

Buffalo — Sales have tapered slightly so far this month, attributed in part to holidays, although distributors report sentiment is definitely better.

Detroit — Active automotive operations induce warehouses to anticipate improved sales for at least the next two months, due to needs for duplicate tools and dies, replacement of broken plant equipment, etc.

Cincinnati — Sales have advanced after a slow start this month. Coal mining requirements are substan-

tial, but demand from manufacturers is tending to taper.

St. Louis—Business is steady, following an upward trend since late summer. Best gains have appeared from general manufacturers, although fencing has moved better than expected. Prices are steady.

Seattle — October business was unchanged from September, but a gain is expected for November. Light sheets continue in best demand. Price cutting in the Portland district is disturbing Oregon sellers.

Tin Plate

Tin Plate Prices, Page 88

Tin plate has been reduced to $5 a base box, Pittsburgh or Gary, effective immediately for shipments over the remainder of 1938 and the first three months of 1939, it has been announced by Carnegie-Illinois Steel Corp. Delivered prices will be determined by freight charges at time of shipment. The change is expected to be followed by other producers.

In recent years, prices were established on a nine-months' basis. This price is a reduction of 35 cents a box, or $7 a net ton. The cut was anticipated for a number of weeks, since tin plate was not affected at the time of the general lowering of steel prices last June.

Tin plate operations generally are unchanged at about 30 per cent, except for a small upturn at Chicago where a moderate accumulation of business is being produced. A little more activity is noted in tin plate requirements for general line can manufacture, but packers' market remain inactive.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 89

Bolt and nut production continues to expand, recently being slightly under 40 per cent. Automotive and jobbers' requirements are heavier and farm equipment builders are taking larger lots. In the East, most current business in bolts, nuts and rivets is attributed directly or indirectly to government spending, although automotive interests contribute heavily to the total. Shipwork is a promising source of business, substantial tonnages being involved in vessels now being figured. Railroad buying continues to lag.

Cold-Finished Steel

Cold Finished Prices, Page 89

Pittsburgh—Cold-finished bar producers are active. Deliveries range from a day or two to three weeks behind in some mills, although some suppliers have been building up inventories the past few weeks and are filling orders upon receipt.

Steel in Europe

Foreign Steel Prices, Page 91

London — (*By Radio*) — October steel ingot production in Great Britain showed the second gain from the low point in August, with 854,800 gross tons, compared with 754,700 tons in September and 658,900 in August. This is an increase of 100,100 tons over September. Pig iron output in October was 469,400 tons, compared with 429,800 tons in September, a gain of 39,600 tons. Active stacks at the end of October numbered 76 compared with 77 at the close of September.

Tone of the market in Great Britain is distinctly better. Foundries furnish good demand for pig iron, semifinished buying is expanding and the finished steel trade is improving from domestic sources though structural demand is slow in the Midlands. Tin plate trade is moderately active.

The Continent reports export trade continuing fair, especially in Northern Europe and Argentine markets.

Semifinished

Semifinished Prices, Page 89

Pittsburgh — Nonintegrated mills have increased semifinished steel purchases materially in anticipation of better finishing operations and in order to avoid delayed deliveries at some later date. Sheet bars are most active, with billets sharing in the rise. Wire rods are in slightly better demand and skelp is steady.

Ferroalloys

Ferroalloy Prices, Page 90

New York—Increasing steelmaking operations continue to be reflected in improved movement of ferromanganese. Shipments now are at one of the high points of the year, having gained consistently for several months. The domestic market is $92.50, duty paid, Atlantic and Gulf ports, with no new development in prices expected much before the middle of next month, at which time sellers are expected to open their books for first quarter. There

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is no indication at the moment as to what prices will be named. Domestic spiegeleisen also is unchanged, with 19 to 21 per cent holding at $28 Palmerton, Pa., and 26 to 28 per cent at $33. Betterment in the steel industry also is stimulating shipments in this and most other leading ferroalloys.

Under 15,000 Affected by Wage Recommendation

(*Concluded from Page* 28)

in the Birmingham area where 7 plants employing 7631 employes, with 988 at the base rate, are located. These plants have a capacity of 1,604,000 tons of pig iron, 1,802,000 of ingots, and 1,336,800 tons of finished hot-rolled products and account for the largest part of the production in the South.

"The plant in the South which employs the largest number of workers pays 36.5 cents.

"There is a low-wage structure existing throughout the South generally.

"The pronounced concentration of wages in the North falls to a lesser degree at 56.5 cents, and to a pronounced degree at 62.5 cents.

"The 62.5-cent wage is paid by all the companies classed as large, with one exception. The wage is paid by a considerable number of firms which have been classified as medium, and by small-sized companies. The wage of 62.5 cents is not exclusively characteristic of any one producing area. In the West there is a range of wages from 55 cents to 70 cents, the rate revealing in this regard similar characteristics to the wage structure in most of the industry in the East. The 62.5 cent wage is widely distributed throughout the eastern area, and there is nation-wide competition between the plants paying this minimum and those which pay a lesser minimum than 62.5 cents."

Recommendations:

Forty-five cents an hour in Louisiana, Arkansas, Mississippi, North Carolina, South Carolina, Florida, Oklahoma, Texas, Alabama, Tennessee, Georgia, and Virginia.

Sixty-two and one-half cents an hour in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Maryland, Delaware, West Virginia, Kentucky, Ohio, Indiana, Michigan, Wisconsin, Illinois, Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, New Mexico, Colorado, Wyoming, Montana, Idaho, Utah, Arizona, Nevada, California, Oregon, Washington, and the District of Columbia.

Further recommendations:

"That further study be made of minimum wages paid in the manufacture of tin plate, tin mill black plate and terne plate;

"That further study be made of the effect of the prevailing minimum wage found for the South on the competition in the industry for government business;

"That further study be made of the position of the smaller companies in the competition for government business;

"That an allowance be made in the determination of this case for the employment of apprentices at wages less than the prevailing minimum wages, provided that the employer has on file an active indenture entered into in accordance with the standards of the federal committee on apprenticeship."

Production Executives Seek Lower Costs

(*Concluded from Page* 25)

ables them to keep informed of actual processing experiences as related to quality and costs; it also permits them to follow through the modification and practice or inspection, which have to be under consideration for certain consumers. The speaker also observed that the processing methods of producer and consumer are often completely dependent on each other.

He said his company's fundamental controls of quality rest largely in: (1) central jurisdiction over the scope of all quality activities; (2) through understanding of and continued personal contact with consumers' needs and problems; and (3) establishment of definite processing and acceptance standards followed by strict adherence to standards under the supervision of the operating personnel, aided throughout by advice and control of metallurgists and inspectors.

Public relations were stressed as industry's major problem by James H. McGraw, Jr., president, McGraw-Hill Publishing Co., Inc., New York. He declared that there were two separate jobs to be done in building public relations, an inside job and an outside job. The former breaks down broadly into six steps, he said, and the latter, the outside job, into four.

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Auto Parts Plant

(*Continued from Page* 85)

Final analysis resulted in construction of two 175,000-gallon tanks, 500 feet from the factory building, to condition the daily and week-end wastes separately. The daily waste passes through one of the 18 x 120-foot tanks at the rate of 150,000 gallons an hour. The treatment requires approximately one hour. The harmless liquid remaining at the end of this time passes into the city sewers. Sludge accumulating at bottom of tank is pumped out and buried on the property.

Machine and other soluble oils which might prove harmful to bacteria in the sewage disposal plant are skimmed out of the daily waste and passed into an oil settling tank.

A similar treatment is given week-end waste in the other 175,000-gallon tank. This process necessarily must be slower, the actual rate being determined by quantity of chemicals found in the solution.

An enclosed glass-lined tank of

13,500-gallon capacity is employed in converting the occasional large dumpings of nickel and copper cyanides into harmless effluents. This process requires three days. Both nickel and copper are reclaimed after this treatment.

Since cyanogen gas generated by the addition of sulphuric acid to the copper cyanide solution is deadly, it is diluted with more than 5000 cubic feet of air per minute to render it harmless, the mixture being exhausted at top of stack, 100 feet above the ground.

Activities of Steel Users, Makers

■ MONARCH Machine Tool Co., Sidney, O., has begun construction of a new two-story building to replace its present office unit. The new structure will add 35,000 square feet to the plant area. Provisions are being made to expand the engineering, erecting, assembling and shipping departments. A showroom, cafeteria, auditorium and a trade school are also proposed.

♦

Alter's Davenport Iron & Machinery Co., Davenport, Iowa, has shortened its name to Alter Co.

♦

Fort Dodge Iron & Metal Co., Fort Dodge, Iowa, has opened a branch office in the Northwestern Bank building, Minneapolis.

♦

Whitman & Barnes, Detroit, has re-established membership with the American Supply and Machinery Manufacturers' Association Inc., Pittsburgh.

♦

National Association of Flat Rolled Steel Manufacturers has moved its offices from 2445 Oliver building, Pittsburgh, to 1845 the same building.

♦

Harnischfeger Corp., Milwaukee, has appointed Sligo Iron Storage Co., St. Louis, distributor for its complete line of Smootharc welding electrodes, in addition to handling its line of electric arc welders.

♦

F. H. Willey, president, Willey's Carbide Tool Co., 1342 West Vernor highway, Detroit, has been granted patent No. 2,133,495, for forming hard, compact metals for tools, required to be formed of hard metal composition such as the sixth group of Mendelejeff's periodic table and the iron group. A copy of this patent and others under which the company operates will be sent to anyone interested.

♦

Central States Industrial Engineers, DeKalb, Ill., has been formed by Henry A. Nelson, Elmer K. Hansen and L. F. Pries, to specialize in the design and building of production machinery for the wire industry. All three were formerly employed by the American Steel & Wire Co.

♦

Easton Car & Construction Co., Easton, Pa., manufacturer of materials handling equipment, recently observed its twenty-fifth anniversary. Organized in 1912, under the management of Ernest Weiner Co., New York, the plant was purchased a year later by W. E. Farrell, who has been president ever since.

♦

Two hydro-generators, with a combined weight of 400,000 pounds, for dam No. 5 on the Colorado river near Austin, Tex., are taking form in Westinghouse Electric & Mfg. Co.'s East Pittsburgh works. Each will produce the equivalent of 7,500,000 watts, or together enough power to light 250,000 sixty-watt household lamps. The machines will be built at a cost of approximately $200,000.

♦

Renown Stove Co., recently celebrated the thirtieth anniversary of its establishment in Owosso, Mich., by holding open house. Gifts were presented to six men who have worked for the company during the entire 30 years, by J. Edwin Ellis, president.

♦

Edward G. Budd Mfg. Co., Philadelphia, builder of lightweight stainless steel rail equipment, has received an order for a seven-car "daylight" type train from the Seaboard Airline. It will be powered by a 2000-horsepower diesel-electric locomotive built by Electro-Motive Corp.

♦

Steel frame of the state cancer hospital under construction at Buffalo has been fabricated entirely by welding, Universal Metal Welding Co., Buffalo, doing the work in about 14 days with five portable welding machines. About 1150 pounds of electrodes were consumed. The building is 105 x 148 feet, five stories. J. H. Mason was superintendent in charge of the work and

Pittsburgh Testing Laboratory was inspector.

♦

Roberts Brass Co., Milwaukee, maker of castings and distributor of brass and bronze supplies, recently acquired by the American Brass Co., division of Anaconda Copper Co., has changed its corporate title to Lincoln Co., remaining a Wisconsin corporation. James S. Parnell continues as secretary.

♦

Howard Foundry Co., Chicago, has been awarded contract for 350,000 bronze assemblies, protecting caps, for 45-second time fuse bombs, by the United States navy. This is the largest single navy contract for these caps since the World war and will require about a year to fill, according to F. C. Howard, president.

♦

Patent on a safety remote control system has been granted to the late Harold A. Tomkins, formerly head of Tomkins-Johnson Co., Jackson, Mich., and L. A. Ward, the company's development engineer. The patent has been assigned to the company. The control is designed for large presses or machines requiring several operators. It necessitates use of all operators' hands in tripping, preventing injury.

♦

Manhattan Rubber Manufacturing division of Raybestos-Manhattan Inc., Passaic, N. J., formerly the Manhattan Rubber Mfg. Co., observed forty-fifth anniversary of its founding and incorporation, Oct. 28. Beginning operations in a building 50 x 150 feet with 40 men, it now employs approximately 3000 persons in a plant covering 800,000 square feet of floor space. Auxiliary plants have been established at Whippany, N. J.; Neenah, Wis., and North Charleston, S. C.

Most Nonferrous Metals Used in Steel Imported

■ American steel producers depend wholly or in large part on foreign sources for seven of the 12 principal nonferrous metals used in steel manufacture, according to the American Iron and Steel institute.

Nearly all the chromium, cobalt, manganese, nickel and tin and a substantial part of the supply of tungsten and vanadium consumed in recent years has been imported. Domestic aluminum, copper, molybdenum, lead and zinc resources, however, have been sufficient to supply needs.

The United States consumes 40 per cent of the world's chromium, 20 per cent of total manganese, 50 per cent of the nickel and 45 per cent of the tin. Chromium is imported from Africa, Cuba, Greece, New Caledonia and Oceania, while manganese comes from Russia, the Gold Coast, Brazil and India. Principal sources of nickel are Canada, Norway and New Caledonia. Tin is imported principally from British Malaya, the United Kingdom, and Netherlands India.

Although no cobalt is produced in the United States, about 10 per cent of the world output is consumed here, imported principally from Canada, Belgian Africa and Australia.

Recently the United States has produced about 10 per cent of the world output of tungsten, consumed about 20 per cent. Principal foreign sources are China and British Malaya. American vanadium production has represented about 15 per cent of the world total, consumption about 25 per cent, the imports coming mainly from Peru and Rhodesia.

About 30 per cent of world aluminum production is produced in the United States, and about 40 per cent of the world's copper output. These exceed the amounts required for steelmaking purposes.

The United States produces about 80 per cent of the world's molybdenum, 30 per cent of the lead and 35 per cent of zinc, more than enough for the steel industry's needs.

Steel Imports Light

Philadelphia—Imports during the week ended Nov. 5 were: Pig iron, 51 tons from the Netherlands; wire rods 23 tons, steel tubes 65 tons, steel forgings 74 tons, steel bars seven tons from Sweden; steel bars eight tons, steel bands 51 tons, and shapes 39 tons from France; and steel bars 45 tons, steel bands 16 tons and shapes 78 tons from Belgium.

Nonferrous Metals

New York—Closing of most metal sales offices on two days last week in observance of holidays slowed down activity in all markets. Sentiment continued to strengthen, however, on the election results and indications of further progress in industrial recovery. Consumption of most of the metals over the balance of the year and into the first quarter of next year is expected to maintain an increasingly favorable rate. The statistical positions of metals have improved with refined stocks in October having declined 6615 tons in zinc and an estimated 30,000 tons in copper and over 10,000 in lead.

Copper—Demand in the foreign market was not quite so heavy early in the week but increased after midweek with Japan and Russia taking large tonnages. Business was done on a slightly rising price trend with a top of 11.42½c reported and with the close at 11.35c, c.i.f. Consumers were hesitant before the

Superior stainless steel finish is more than skin deep—it permeates the entire strip. Its physical characteristics make it ideal for fabricating—without huge losses due to strains and stresses in the metal.

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General Office: Grant Building, Pittsburgh, Pa. *Works:* Carnegie, Pa.

election but stepped up their purchases later in the week to a moderate volume. Prices were firm at 11.25c, Connecticut, for electrolytic.

Lead—Buying was spotty during the early part of the week but consumers, including oxide and battery manufacturers, showed more interest later in the week. November requirements have been approximately 85 per cent covered. Several large producers were able to balance or exceed the ore intake on Wednesday and Thursday. Prices were firm on the basis of 4.95c, East St. Louis.

Zinc—The statistical report, showing a decline in stocks, to 124,128 tons at the end of October compared with 149,671 at the end of June, failed to stimulate consumer demand. Due to the well-sold position of leading producers, the steady light turnover was considered satisfactory and prices held at 5.05c, East St. Louis, for prime western.

Tin—Straits spot advanced steadily, closing at 46.70c, a new high for the year to date. Buying spurted in both the London and domestic markets, reflecting the favorable interpretation of the election.

Antimony—Prices were unchanged at 12.25c, New York, for American spot and nominally 14.00c, duty paid New York, for Chinese spot in a dull market.

Equipment

Cleveland — November machine tool and equipment sales have started out actively and are expected by many dealers to exceed those of October. Navy department purchases, estimated to exceed $4,000,000 in the next seven months, and an expected increase in domestic industrial releases presage continuance of the uptrend for several months at least. Both manufacturers and dealers are expecting additional releases to result from conservative gains in last week's elections. Foreign shipments continue of major importance and include a fairly wide variety of equipment.

Seattle — Bonneville administration has called bids at Portland, Nov. 29, for furnishing switching apparatus for six substations in Oregon and eight in Washington state, cost $750,000. Also Nov. 12 for furnishing two medium, heavy class tractors. Washington state has awarded a contract to North Coast Electric Co., Seattle, for furnishing electrical equipment for the custodial school at Buckley. Tacoma received identical bids, $46,147, from General Electric and Graybar Electric Co. for furnishing six 5000-kva transformers.

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

	Copper										
	Electro, del.	Lake, del.	Casting,	Straits Tin, New York		Lead	Lead East	Zinc	Aluminum	Antimony Amer.	Nickel Cathodes
Nov.	Conn.	Midwest	refinery	Spot	Futures	N. Y.	St. L.	St. L.	99%	Spot, N.Y.	
5	11.25	11.37½	10.77½	46.25	46.40	5.10	4.95	5.05	20.00	12.25	35.00
7	11.25	11.37½	10.77½	46.25	46.40	5.10	4.95	5.05	20.00	12.25	35.00
8—Holiday											
9	11.25	11.37½	10.77½	46.50	46.65	5.10	4.95	5.05	20.00	12.25	35.00
10	11.25	11.37½	10.77½	46.65	46.80	5.10	4.95	5.05	20.00	12.25	35.00
11—Holiday											

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high) 17.50
Copper, hot rolled 19.37½
Lead, cut to jobbers 8.25
Zinc, 100 lb. base 9.75

Tubes

High, yellow brass 20.25
Seamless copper 19.87½

Rods

High yellow brass 13.37½
Copper, hot rolled 15.87½

Anodes

Copper, untrimmed 16.62½

Wire

Yellow brass (high) 17.75

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

New York 7.10-7.20
Cleveland 7.50-7.75
Chicago 6.87½-7.12½
St. Louis 7.00-7.25

Heavy Copper and Wire

New York, No. 1 .....8.62½-8.87½
Cleveland, No. 1 .....8.50-8.75
Chicago, No. 1 .....8.50-8.75
St. Louis 8.50-8.75

Composition Brass Borings

New York 6.20-6.45

Light Copper

New York 7.12½-7.37½
Cleveland 6.75-7.00
Chicago 6.75-7.00
St. Louis 7.00-7.25

Light Brass

Cleveland 4.00-4.25
Chicago 4.50-4.75
St. Louis 4.50-4.75

Lead

New York 4.00-4.25
Cleveland 4.00-4.25
Chicago 4.00-4.12½
St. Louis 4.00-4.25

Zinc

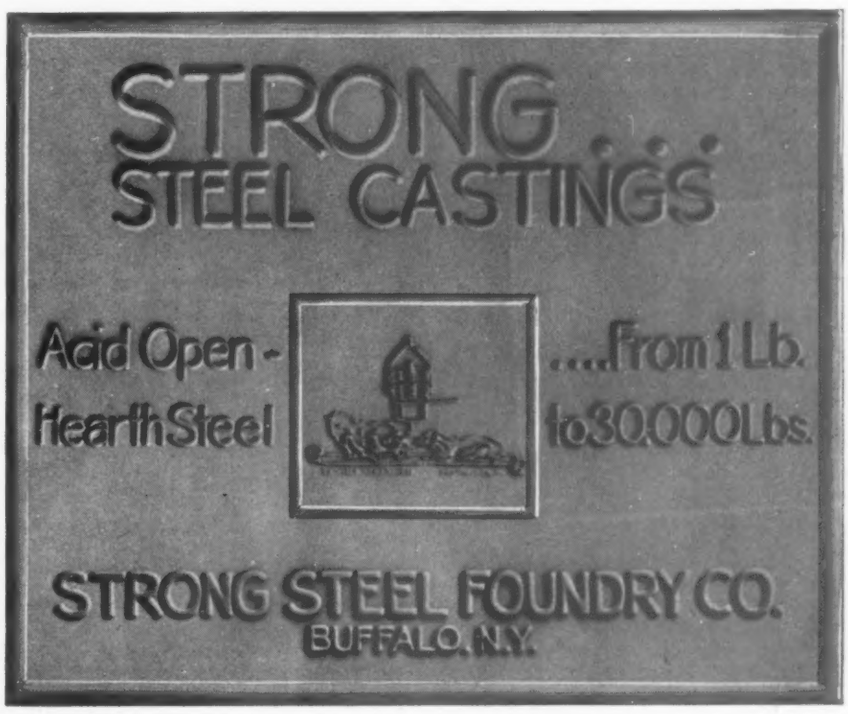
New York 2.50-2.62½
Cleveland 2.50-2.75
St. Louis 2.75-3.00

Aluminum

Borings, Cleveland 6.50-6.75
Mixed, cast, Cleveland 8.75-9.00
Clips, soft, Cleveland 13.25-13.50
Mixed cast, St. Louis 9.25-9.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads, 11.62½
Standard No. 12 aluminum....14.00-14.50



Construction and Enterprise

Ohio

CINCINNATI, O.—City, C. O. Sherrill, manager, will probably take bids soon on improvements to its waterworks at cost of approximately $1,428,499; PWA has allotted grant of $642,802. J. E. Root, city hall, director of public works.

DAYTON, O.—Army air corps, materiel division, contracting officer, Wright field, will receive bids to 10 a.m., Nov. 17, for three rotating, hand-operated, bench-type turret punches with 12 punches and dies (Circular 39-355).

DESHLER, O.—Village, G. E. Staver, board of trustees, probably will take bids soon on construction of proposed water treatment plant to cost estimated $33,000; PWA grant approved. Consulting engineer, Carl Simon, Van Wert, O.

GREENWICH, O. — Village, Charles Grum, mayor, is taking separate or collective bids due noon, Nov. 28, on three contracts for water softening and iron removal plant. Consulting engineer, R. F. MacDowell, Cleveland. Certified check or bid bond 5 per cent to accompany bid. (Noted Oct. 31.)

LORAIN, O. — City, Paul Mikus, service director, has plans which will probably mature soon for waterworks improvements including new lines, pumps and boiler improvements costing total of about $110,000. Consulting engineers, Wilbur Watson & Associates, Cleveland. (Noted Oct. 10.)

MONTPELIER, O.—Village, J. M. Hoover, superintendent of utilities, has received approval by PWA of grant in the projected construction of a water softening plant including filters, mixers, settling tanks, clear wells and 200,000-gallon elevated steel storage tank; project to cost $112,660. Consulting engineer, H. P. Jones Co., Toledo, O.

SALEM, O.—City, George Harroff, mayor, has received PWA grant and will take bids soon on waterworks improvements to cost about $62,945. F. S. Barckhoff Sr., city engineer.

RAYLAND, O.—Village, Joseph Hunter, mayor, has drawn preliminary plans and applied to PWA for a grant in the improving of its water distribution and sewer systems at total cost of about $65,000. Max Gorsuch, Steubenville, O., consulting engineer.

WOOSTER, O. — City G. E. Allspaugh, service director, is taking bids due at noon, Nov. 17 for constructing 1,000,000-gallon steel tank as part of $81,819 water project. Bond 10 per cent or certified check $2500 to accompany bids. City engineer, J. E. Fox. (Noted Nov. 7.)

Connecticut

GROTON, CONN.—Borough is asking bids due Nov. 21 on construction of a water filtration plant (Contract No. 2). Metcalf & Eddy, Boston, engineers. (Noted Oct. 24.)

NEWTON, CONN.—State, R. A. Hurley, commissioner of public works, Hartford, Conn., takes bids due Dec. 28 on construction of a brick, steel and concrete addition to power plant, including installation of a 375-horsepower boiler and turbine; cost about $67,135. F. J. Dixon, state office building, Hartford, Conn., architect.

SOUTHBURY, CONN.—State, R. A. Hurley, commissioner of public works, Hartford, Conn., takes bids in January for a brick, steel and concrete institutional power plant with steam and electric service lines, at total cost of about $610,000. Plans drawn by F. J. Dixon, state office building, Hartford, Conn.

Rhode Island

PROVIDENCE, R. I.—City, department of public works, is preparing plans to construct a sewage disposal system costing $1,200,000; PWA has approved $540,000 grant on project. S. F. Nolan, city engineer.

PROVIDENCE, R. I.—City is making preliminary plans for building a water purification plant to cost about $782,268 on which PWA has allotted $352,021. S. F. Nolan, city engineer.

New York

FRANKFORT, N. Y.—Union Fork & Hoe Co., Columbus, O., plans to install electric power equipment in proposed addition to its agricultural equipment plant. (Noted Oct. 17.)

ITHACA, N. Y.—New York State Gas & Electric Co., 123 South Cayuga street, is taking bids for furnishing labor and materials in construction of rural electric power lines in various counties.

JAMESTOWN, N. Y.—Hopes Windows Inc., 84 Hopkins avenue, is taking bids on general construction of a plant to cost about $100,000. Beck & Tinkham, Bailey building, architects.

PERU, N. Y.—Peru Water & Sewer district is taking bids on construction of sewers and sewage treatment plant costing $85,000. L. G. Brown, Plattsburg, N. Y., engineer.

SCHUYLERVILLE, N. Y.—Village is receiving bids on construction of sewers and sewage treatment plant to cost $164,306. Solomon & Keis, Troy, N. Y., consulting engineers.

New Jersey

NEWARK, N. J.—City plans to reconstruct dams, water outlets, chlorine treatment plants and lines in its water system at estimated cost of $1,203,400. J. Costello, city engineer.

Pennsylvania

AMBRIDGE, PA. — Borough, T. B. Gibson, manager, awarded contract to Walter S. Rae, Koppers building, Pittsburgh, at $148,000, for constructing improvements in water system. Consulting engineer, Peter F. Loftus, Pittsburgn.

WILSON, PA. — Borough council will take bids around Dec. 1 for constructing sanitary sewerage system and sewage treatment plant costing about $750,000. PWA approved grant of $341,066. J. D. Carpenter, Harrisburg, Pa., engineer.

Michigan

CLINTON, MICH. — Village probably will take bids soon on light plant improvements for which PWA has granted $55,000 and voters approved $80,000 bond issue. (Noted Sept. 19.)

LUDINGTON, MICH. — City will make alterations and extensions in its waterworks system at estimated cost $95,000. Consulting engineers on project are Consoer, Townsend & Quinlan, Chicago.

STURGIS, MICH. — City is completing plans for construction of an addition to its electric distribution system costing $274,000 and providing installation of a new diesel unit. Ayres, Lewis, Norris & May, Ann Arbor, Mich., engineers.

Illinois

MOLINE, ILL.—City, A. H. Arp, mayor, plans a sewage disposal plant and sewers to cost a total of $1,400,000. PWA has approved allotment of $630,000. Consoer, Townsend & Quinlan, Chicago, engineers.

Indiana

INDIANAPOLIS—Board of trustees, state school for deaf, 1050 East Forty-sixth street, has plans maturing for extensions and improvements in institution's boiler plant, including installation of two water-tube boilers, stokers, combustion controls and ash-handling equipment. Bevington-Williams Inc., consulting engineers.

Alabama

BIRMINGHAM, ALA.—Alabama Power Co. has been allotted $359,000 by REA for erection of 130 miles of new transmission lines in 15 counties and to improve existing lines.

CLAYTON, ALA.—REA has allotted loan of $374,000 to Pea River Electric Membership Corp. to build 407 miles of rural power transmitting lines in three counties.

SCOTTSBORO, ALA.—City, J. W. Woodall, mayor, receives bids Nov. 22 for constructing proposed electrical distribution system costing approximately $103,000. Lide & Adler, Birmingham, Ala., consultants. (Noted Aug. 29.)

Kentucky

LUDLOW, KY.—PWA has granted $55,000 to city to aid in construction of improvements to its waterworks costing $122,000; plans provide for wells, pumps, mains and water treatment plant with 1,000,000-gallon daily capacity.

Georgia

CALHOUN, GA.—Mt. Alto Spred Co. is constructing a steel and brick manufacturing plant, two-story, 65 x 225 feet.

THOMASBORO, GA.—City has approved issue of $50,000 bonds for construction of sewer and water lines. Kenneth Dickson, Thomasboro, consulting engineer.

THOMASTON, GA. — Upson County Electric Membership Corp., T. S. Jackson, superintendent, will let contract about Dec. 1 for construction of 121 miles rural power transmission lines through two counties, on which it was allotted $129,000 grant by REA. (Noted Oct. 31.)

Mississippi

CANTON, MISS.—City, C. N. Harris, mayor, receives bids Nov. 28 for the installation of boiler, turbine and generator in municipal plant; approximate cost, $47,800. J. B. Williams, Yazoo City, Miss., consulting engineer. (Noted Oct. 3.)

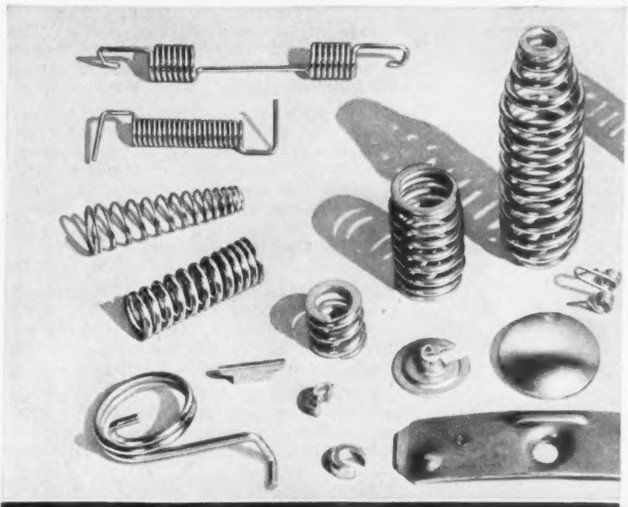
COLUMBUS, MISS.—City, T. W. Lewis Jr., secretary-treasurer, receives bids Nov. 25 for construction of electric distribution system for which $281,000 is available. A. H. Beard, St. Louis, engineer. (Noted Aug. 1.)

GULFPORT, MISS. — City has engaged architects-engineers Shroud & Bean to complete plans for constructing warehouse of five sections at municipal pier; RFC has approved $300,000 loan on project.

North Carolina

HENDERSON, N. C.—Corbitt Co. is

"It is a Raymond policy to investigate new materials and methods which appear to promise improved spring performance"



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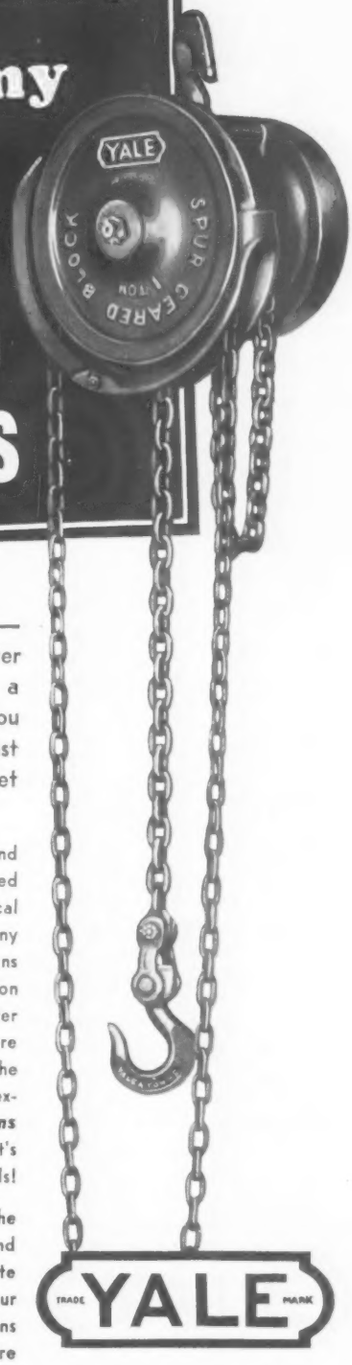

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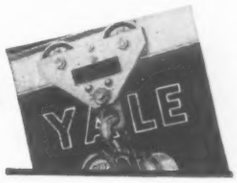

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planning to rebuild its body plant, destroyed by fire recently.

WILMINGTON, N. C.—American Hardware & Equipment Co., 9 Water street, is planning to enlarge and improve its warehouse.

Tennessee

CHATTANOOGA, TENN. — Electric Power board, L. J. Wilhoite, chairman, has been awarded federal grant of an additional $3,279,000 for construction of proposed municipal power distribution system.

Virginia

APPOMATTOX, VA.—Town council has been granted $24,450 by PWA for construction of sewer system costing $65,000. J. W. Cawthon is town manager. J. B. McCrary Co. Inc., Atlanta, Ga., engineer.

HOPEWELL, VA. — Hercules Powder Co. has begun preliminary work in construction of $100,000 addition for making soda and chlorine in manufacture of cellulose; unit will consist of three one-story, steel frame, 50 x 100-foot buildings.

RICHMOND, VA.—Sanitary Sewer district No. 1, Willard F. Day, Henrico county manager, has $101,335 PWA grant for constructing sewerage system estimated to cost $225,000.

STAUNTON, VA.—City is taking bids due Nov. 18 for installing sewage interceptors costing about $112,000. Whitman, Requardt & Smith, Baltimore, engineers.

Missouri

AFFTON, MO.—Affton Sanitary Sewer district will vote in 60 days on $41,000 bond issue, and has applied to WPA for grant of additional $74,000, in proposed construction of trunk line sewers and sewage disposal plant costing estimated $115,000. George S. Russell, 4903 Delmar, St. Louis, consulting engineer.

AURORA, MO. — Aurora Mining & Development Co. has been organized with $50,000 capital by Larry Brunk and E. H. Winter.

KANSAS CITY, MO.—Empire Storage & Ice Co., Ralph Wilkerson, general manager, plans early erection of four-story cold-storage and refrigerating plant, 74 x 110 feet, and costing in excess of $75,000 with equipment. Alfred Benberg, Kansas City, consulting engineer.

KIRKWOOD, MO. — City has voted $68,000 bond issue and applied for $55,000 PWA grant in the proposed construction of improvements in its electrical transformer station; will buy current from Union Electric Co. (Noted Oct. 24.)

LEES SUMMIT, MO.—Common council has plans underway for new municipal electric power plant with diesel engine generating unit, costing over $50,000, and providing Federal financing. E. T. Archer & Co., Kansas City, Mo., engineer.

NEW LONDON, MO. — City has been allotted $21,000 PWA grant in the construction of sewerage works costing $46,764, and including collecting sewage system and treatment plant.

Arkansas

CONWAY, ARK.—City plans to improve its waterworks, involving new 10,000,000-gallon settling basin, 1,000,000-gallon clear water basin and chemical feed equipment; PWA has approved $77,000 loan and $63,000 grant on project.

Oklahoma

ALLEN, OKLA. — Sunday Oil Co. is constructing a catalytic polymerization cracking unit at its refinery under license from Universal Oil Products Co., Chicago.

STILLWATER, OKLA. — Board of trustees, Oklahoma Agricultural and Mechanical college, plans new plant to provide heat, light and power; to cost about $675,000 including federal grant. Phillips A. Wilbur, college engineer.

Wisconsin

LA CROSSE, WIS.—Vocational school has awarded general contract for constructing two and three-story addition, 141 x 200 feet, costing about $300,000 to Robert Regan Co., 228 North LaSalle street, Chicago.

WAUPUN, WIS.—Breyer Bros. & Whiting Co., builder of tanks, is starting work on a two-story, 40 x 71-foot, and one-story 35 x 71-foot addition to its factory.

Minnesota

ST. PAUL—E. E. Wylie Inc., 2239 Highland Ford parkway, has received $395,040 contract from Stearns County Co-operative association, C. P. Stahlberger, superintendent, for constructing 509-mile rural electric distribution system.

Texas

BLANCO, TEX. — City, R. E. Stubbs, mayor, has applied to PWA for $21,841 grant towards construction of waterworks system costing $48,536. Project Tex. 2650. Consulting engineer, Homer Trimble, 605 Bellevue place, Austin, Tex.

CORSICANA, TEX. — Navarro County Electric Co-operative Inc. has received additional REA allotment of $200,000 for constructing transmission Unit C through three counties.

ELECTRA, TEX.—City, A. B. Corder, mayor, receives bids Nov. 22 for improvements to waterworks, including new pumping equipment, for which $145,000 is available. Joe E. Ward, Wichita Falls, Tex., consulting engineer. (Noted Oct. 17.)

HOUSTON, TEX.—American Chain & Cable Co., 905 Live Oak street, plans installation of electric power equipment in its projected one-story, 150 x 150-foot plant costing over $80,000. Work on the project is scheduled to begin soon.

KERRVILLE, TEX.—City, A. P. Hancock, manager, receives bids Nov. 22 for construction of waterworks, sanitary sewer improvements and new sewage pumping station for which available funds total $60,000.

LUFKIN, TEX.—Texas Foundries Inc., W. C. Trout, president, recently incorporated with $450,000 capital, has let contract for construction of plant in which it will manufacture malleable iron castings for heavy machinery.

LULING, TEX.—City, J. G. Stein, mayor, has voted to issue bonds and apply to PWA for grant in the proposed construction of an electric distribution system costing $117,000. Homer Trimble, Austin, Tex., consulting engineer.

MULESHOE, TEX. — Bailey County Electric Co-operative association has received $178,000 REA allotment for constructing 216 miles of power transmission lines in five counties.

PORT ARTHUR, TEX. — City votes Nov. 15 on proposal to issue $235,000 bonds to finance $342,000 municipal improvement program which includes extensions in water and sewerage systems.

SAN ANTONIO, TEX. — San Antonio Public Service Co., D. A. Powell, vice president, plans expenditure of approximately $1,000,000 in 1939 for improvement of plant in its electric and gas systems.

SANGER, TEX.—City, R. G. Hurd, mayor, receives bids Nov. 19 for alterations to electric generating plant for which $48,000 is available; include 150-kilowatt and 200-kilowatt diesel generating units. Municipal Engineering & Finance Co., Dallas, Tex., engineers.

STEPHENVILLE, TEX.—REA has allotted $189,000 to Erath County Electric Co-operative association in the construction of 213 miles rural distributing lines through two counties. Consulting engineer, William G. Morrison, Waco, Tex.

Pacific Coast

HOLTVILLE, CALIF. — Certificate to conduct business under the firm name of Holtville Iron & Metal Co. has been issued to A. V. Stephens, owner, 538 West Seventh street.

LOS ANGELES—Pioneer-Flintkote Co. has awarded contract for constructing 270 x 350-foot concrete and corrugated iron factory and warehouse costing over $150,000, to Austin Co., 777 East Washington boulevard.

LOS ANGELES—American Pneumatic Tool Co., 1621 South Hill street, has been formed by Robert Irving, 9241 Doheny drive.

LOS ANGELES — Certificate to conduct business under the name of Acme Saw Works, at 6213 Avalon boulevard, has been issued to the owners, R. C. Benson and Karl Hawkins, 6038 Second avenue.

LOS ANGELES — Pennsylvania Iron & Steel Co., 2451 East Twenty-third street, is ready to build a 33 x 170-foot addition to its warehouse.

LOS ANGELES — Sterling Pump Corp. has been incorporated with capital of 50,000 shares of stock, no value stated. Directors are: C. S. Peabbles, L. E. Gray and H. E. Grantland, all of Wilmington, Del.

PORTLAND, OREG.—Bonneville power administration has plans underway for constructing near Vancouver, Wash., a 220,000-volt power substation costing about $750,000.

OLYMPIA, WASH.—State highway department has called bids Nov. 22 for constructing at Spokane, Wash., a $46,000 shop building, and at Vancouver, Wash., a $10,000 equipment storage warehouse.

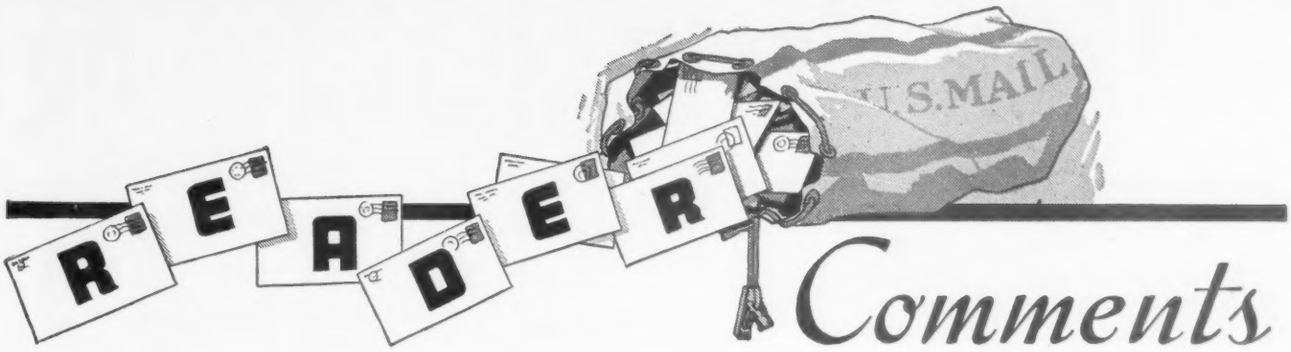
PULLMAN, WASH.—G. C. Moore and associates are contemplating construction near here of a $75,000 refinery to handle crude oil products from Montana fields, in particular, stove, tractor and diesel engine fuels.

TACOMA, WASH.—Gem Mines Inc. has been organized with capital of $250,000 by H. M. Anderson and associates, 935 Broadway avenue, Tacoma.

Canada

UCHI, ONT.—Uchi Gold Mines Ltd. is making plans and preparing to construct a projected mill whose cost is approximated at $500,000.

CADILLAC, QUE.—Amm Gold Mines Ltd., Toronto, Ont., has awarded $143,000 contract to Mill Builders Ltd., Main street, Haileybury, Ont., for constructing a 125-ton ore mill.



Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

India Plans Auto Plant

To the Editor:

Establishment of an automobile industry will be the first item on the program for development of industries in India. It is presumed this country will be able to produce her own motor cars by the middle of 1941. The industry will develop mechanical skill among Indian workmen and pave the way for development of high-class machine industries, including locomotives and airplanes.

It is suggested that the proposed automobile plant be located in Bombay, where raw and semiraw materials, skilled labor and other facilities are available. Motor parts and accessories can be more easily and cheaply imported into Bombay than into an interior station like Jamshedpur.

Proposed annual capacity of the plant will be 10,000 cars and 5000 trucks. Actual yearly production may number about 12,000.

For the first few years it is proposed to import 30 per cent of the parts, chiefly special parts. As local factories may come forward to take up manufacture of parts the parent company will be relieved of its capital cost.

In the early stages it is proposed to manufacture medium-power passenger cars like Ford V-8 and Chevrolet and commercial trucks of half-ton capacity. The next step will be manufacture of a low-power car like Austin 7, 10 or 12. Factory construction will require about two years but in the first year assembling parts could be undertaken. In the second year assembled vehicles may go up to 6000 and in the third year about 12,000.

Sir M. Visvesvaraya, who has made a detailed survey, believes the best course is to ask a leading foreign manufacturer to design, construct, equip and set up the factory.

It is proposed to finance by a joint stock company on an all-India basis, controlled by a board of nine directors.

On the basis of present sales of cars it is estimated, subject to reservation, that a 20 per cent yield should be possible.

As regards state aid government of India may refund the duty on imported parts and accessories and extend freight facilities. Provincial governments can finance the industry and guarantee the purchase of motor vehicles for government use.

At a recent meeting of the industries members of nine provincial governments, the above scheme was approved and active steps are under way to give it effect.

A. P. SOM

Jamshedpur,
India

Workers Are Reasonable

To the Editor:

Taking the mystery out of financial statements will go a long way toward improving employe relations in the steel industry and more companies than formerly realize this. Putting the facts before the workers, as is being done by Bethlehem Steel Co., as related in in STEEL, Nov. 7, page 27, goes far in depriving the agitator of a weapon for causing discontent.

Most of us in the ranks are reasonable but it is human nature to listen and perhaps believe when it is claimed we are being victimized to the profit of the stockholder. When the figures are explained we see the real situation and get a hint of the problem of management.

CRANEMAN

Johnstown, Pa.

Wisconsin Leads the Way

To the Editor:

Election of Julius P. Heil as Wisconsin's governor is an encouraging sign that sanity is returning to the electorate and that voters prefer a business man to a professional politician. This altered attitude is far more significant than any shift in strength of political parties. Whether Mr. Heil is a Republican or a Democrat means far less than that he is a successful, practical industrialist.

That he has been elected in a state long regarded as a "pocket borough" of the LaFollette family indicates the people are weary of political tinkering by theorists and prefer a man who understands business and economics.

Another important consideration is that voters have taken little stock in the "economic royalist" label and have faith in business men despite criticisms by new deal spokesmen. They welcomed an opportunity to vote for a practical man.

Few states have suffered more than Wisconsin from experimental radical legislation. It has been a "guinea pig" for theorists who have hampered business and harmed the worker.

This success may encourage business men in other states to enter politics, even at a personal sacrifice. They may be surprised at the support they will receive.

As part of the educational campaign to sell industry to the man on the street and stem the tide of propaganda against successful business it is becoming a public duty for its representatives to get out in front and fight for its ideals.

MANUFACTURER

Milwaukee, Wis.

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